

LIVESTOCK SECTOR REPORT

VIETNAM

IDENTIFYING BARRIERS TO ENTRY TO LIVESTOCK INPUT AND OUTPUT MARKETS IN SOUTHEAST ASIA

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EXECUTIVE SUMMARY

Livestock accounts for about 23 percent of GDP from agriculture in Vietnam. It also provides at least 50 percent of cash income in smallholder households. Pigs and poultry are the most widely raised species, particularly in rural areas, where about 77 percent of meat production is pork, 16 percent is poultry meat and the rest is comprised of beef and other types of meat. In addition, livestock is also important for providing high quality protein to millions of smallholders, thus enhancing their nutrition.

Over the last decade, the livestock sector has made significant progress toward the development of a domestic market for meat, as well as some inroads into the export market. Moreover, there has been increasing concern about meat quality and safety in both the domestic and export markets, thus creating new challenges for the key players in the Vietnamese livestock sector. The Vietnamese government recognizes that to guarantee the sector's competitiveness in the emerging political and economic environment, an effort has to be made to improve productivity through modernization, and enhance product value and quality through regulations and a comprehensive investment strategy. This augurs well for the development of the sector, and could pave the way for increased participation by smallholder livestock producers in the development process as long as the appropriate policies and institutions are in place.

This study provides a comprehensive review of the development of the livestock sector during the last decade. It specifically identifies barriers to livestock input and output markets for smallholder livestock producers. It subsequently identifies potential areas for research and development issues that can be addressed through policy and institutional reforms. The commodity focus in this country report is the pig and poultry sector. Both sectors, particularly the pig sector, have been growing rapidly and are on the verge of structural transformation, in response to both internal and external forces, namely the expanding domestic demand and the opportunities for export.

Specifically, barriers to livestock input markets include the uncertain quality and high prices of animal feeds including raw materials for feed processing, the variable quality and high cost of more productive animal breeds, and the inefficient delivery of veterinary services and high cost of veterinary inputs. The development of output markets is constrained by the poor quality and lacking safety of meat, unsatisfactory legal framework and standards, bottlenecks in the distribution channels, and limited access to information. In addition, the prevailing marketing system and channels from farm to market for each type of commodity has evolved into a multi-layer system that is characterized by high transaction costs, and a lack of integration among the actors in the various channels. The absence of an organized marketing system for livestock in Vietnam does not provide an enabling environment that will encourage producers to improve production activities for lack of some basis for comparison. Moreover, it also exacerbates the low market power producers have relative to other market participants such as the traders and wholesalers.

It is envisioned that the government could play a regulatory role in ensuring that standards and regulations to produce high quality, safe meat and meat products will be enforced and sustained. Moreover, research into the development of alternative production models that are suitable to smallholder producers while at the same time capable of generating high quality and safe meat and meat products would be important in encouraging more smallholder participation in the emerging markets for livestock. Collective action to take advantage of economies of scale in input procurement as well as output marketing could potentially be developed and tested for replication on a wider scale. Government support for these initiatives would certainly be welcome.

I. INTRODUCTION

From the early 1980s to the late 1990s, meat consumption in Southeast Asia (SEA) has grown between 4 and 8 percent per year (Delgado et al. 1999). This increase was fueled by rapid annual income growth (4 - 8 percent) population growth (2 - 3 percent) and progressing urbanization (4 - 6 percent). The increasing demand for livestock products in the region, which is expected to continue well into the future, presents expanding market opportunities for livestock producers in the region. However, the terms under which the poor livestock producers enter these livestock input and output markets are often inequitable because of the presence of high transaction costs (including physical and institutional barriers). Transaction costs can be defined as the pecuniary and non-pecuniary costs associated with arranging and carrying out the exchange of goods and services. The liberalization of domestic markets and the globalization of international trading regimes have made livestock markets more open but at the same time more complex and risky for the poor smallholder livestock producers.

The inability of farmers to market their livestock products or to have access to livestock input markets and services, reduces their income and access to cash, and prevents asset accumulation. Therefore, fostering the ability of poor livestock producers to enter markets and actively engage in them is a pressing development challenge. Removing or reducing the barriers to market access and facilitating market participation for poor livestock producers can contribute to poverty alleviation. This important concern was also recognized by participants of the recent ILRI/FAO/JLTA/ DLD workshop on "Research and Development Strategies for the Livestock Sector in Southeast Asia through National and International Partnership" held in Bangkok during 11-15 March 2002. Collectively, workshop participants identified market access problems as key constraints to raise poor households' levels of livelihood assets in the form of capital, improved nutrition, better education, and an easier access to health infrastructure. Among the participants in the workshop were representatives of Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Vietnam. Participating international research and development organizations were ILRI, FAO, and CIAT¹. In the light of the findings of the workshop and the perceived need to obtain more information on barriers to market entry, the FAO commissioned ILRI to undertake a study on barriers to market entry by smallholder livestock producers.

This country report focuses on the livestock sector in Vietnam and provides a comprehensive view of the development of the sector during the last decade, with particular emphasis on the pig and poultry sector, and identifies barriers to market access for smallholder producers. The focus on these two sectors, particularly on pigs, is explained by the increasing importance in terms of contribution to the overall livestock GDP in the country. Moreover, the pig industry is a rapidly growing industry in the country and is on the verge of structural change given the existing policy environment. This report attempts to provide a timely contribution to understanding this structural transformation in order to identify the appropriate policies and institutions for making the transformation process more balanced and equitable.

The report is organized as follows: Section II describes the existing livestock policy environment, Section III discusses the structure of the industry and its changes over time, Section IV identifies the barriers to livestock input and output markets, Section V focuses on the role for policy interventions in addressing constraints, Section VI cites some examples of successful interventions to address the barriers to markets, Section VII identifies some potential areas for research and development, and Section VIII provides a summary and conclusion.

¹ Details of the workshop are in A. Frio and D. Gray (eds.), Research and Development Strategies for the Livestock Sector in South-East Asia through National and International Partnerships: Proceedings of the Workshop held in Bangkok, Thailand, 11-15 March 2002. International Livestock Research Institute (in press).

II. LIVESTOCK POLICY ENVIRONMENT

In the last decades of the twentieth century, Vietnam progressed from a nation of chronic food shortages to one of the world's leading exporters of agricultural products including rice, coffee, rubber, and tea. This economic growth, marked by a doubling of gross domestic product between 1991 and 2000, was largely made possible by the *doi moi* reforms of the 1980s. *Doi moi* consisted of two successive reforms: the allocation of the production factors (especially land) to individual households, followed by economic liberalization and the opening of the country to external markets (Castella and Dang 2002).

The remarkable economic growth that resulted from these reforms was based largely on the rural households, which had become the new unit of agricultural production. The technical, economic, and social changes that accompanied the transition transformed agricultural production, resource management, land use, and the institutions that defined resource access and distribution. However, the impact of the changes varied widely across different regions. In particular, agricultural growth in the past decade has benefited the delta regions far more than the more remote mountainous areas (Kerkvliet and Porter 1995; Poverty Task Force 1999; Minot and Baulch 2002). Of further interest are the different impacts of these changes across sectors and within sectors in the economy. On the latter, a comprehensive study was undertaken on the rice sector analyzing the policy issues and impacts of the reforms, specifically the liberalization of the rice markets (Minot and Goletti, 2000). The study indicates that market reforms have had a positive effect on economic growth, agricultural production, and the rice sector. Furthermore, survey data reveals that rural incomes have risen as a result of the reforms.

About 93 to 95 percent of the poor live in rural areas in Vietnam. In spite of these gains, poverty rates are still high, and the benefits of liberalization have probably not been distributed equally among regions and between urban and rural areas.

Unlike for the rice sector and other sectors, there is no specific government policy in place for the livestock sector. A draft rural development strategy has been prepared by the Government of Vietnam in 1998, which will form the basis for future consultations between the government, the donor community, and other stakeholders. The strategy is intended to cover key issues concerning rural development and to cast some light on the government's vision for rural development. The major tasks ahead are described as:

- Increasing agricultural productivity and farm incomes
- Stimulating employment in non-farm rural activities
- Managing natural resources and conserving important ecosystems
- Targeting persistent poverty in the uplands

In the context of rural income diversification, the livestock sector has a key role to play. However, so far there exists no clearly specified set of priorities and policies as it is the case for other agricultural commodities like sugar and rice. Existing policy focuses solely on the level of targets for production and consumption. With the opportunities the sector offers for wider rural development, this is a major omission. A clear policy, which contributes to broad-based growth, poverty alleviation, and the creation of an environment conducive to active private sector participation, will be the foundation on which specific livestock sector development activities will make the best contribution.

The current 'implicit' policy is reflected in the government's public expenditure priorities. These do not favour the support services for small farmers, which are under-resourced and weak. The infrastructure for the provision of services is extremely weak, a situation which is exacerbated by the fact that the officers in place have little information and few skills to pass on.

Despite this, some of the important changes in policies for other agricultural sectors contributed greatly to livestock development. The implementation of resolution N10 in 1998 was a significant step in promoting individual households as independent economic units of production and marketing of their products. This resulted in important changes that facilitated positive developments in animal and crop production. These changes were apparently facilitated by the Vietnamese government's new policy to promote small livestock farming among smallholder farmers, with pigs and poultry being two

of the more important species that are currently get support through various government and/or donor-supported programs.

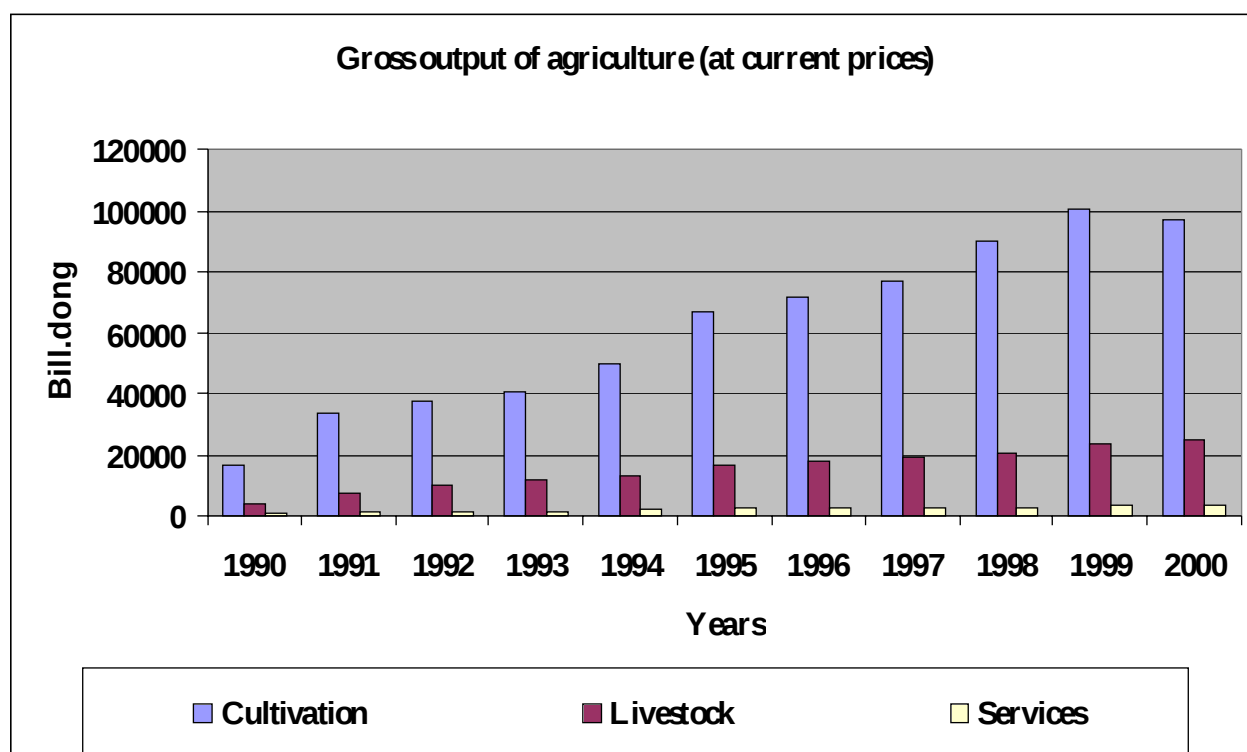
In 2002, the Vietnamese government launched a nationwide program on “Hunger Alleviation and Poverty Reduction” to support resource-poor farmers and improve the living conditions of people in rural areas. The program involves the provision of low-interest credit to poor farmers, specifically for the purchase of piglets, beef cattle, and dairy cows. This program has encouraged more farmers to engage in livestock production. With the government’s active promotion of intensification in crop and livestock production, farmers have been motivated to diversify their rice-based farming systems and integrate livestock production with rice production.

III. STRUCTURE OF THE INDUSTRY AND CHANGES OVER THE PAST TWO DECADES

During the past ten years, the value of production of the agricultural sector increased six-fold (at current prices), while the value of livestock sector increased 6.7 times. The data shows that the livestock sector is growing faster than agriculture in total. In 1990, the livestock sector accounted for about 18 percent of total value of agriculture, increasing to about 20 percent in 2000 (Figure 1). This indicates that a shift in the production structure of agriculture is taking place. For the past five years, the livestock sector has been growing at a rate of about 6-7 percent annually. Generally, the development in the livestock sector during the last decade is faster than its development from 1954 to 1990. The development during the last ten years was fueled mainly through the implementation of specific laws and reforms that had positive impacts on the livestock sector.

Livestock are predominantly raised in small-scale household production units. At present, smallholder producers supply the majority of meat in the market, with most of the households operating individually in the production and marketing of livestock and livestock products. To a limited extent collective action mechanisms to produce and sell livestock and livestock products are currently in place in Vietnam. There also operate a number of large-scale farms producing thousands of pigs per year. These farms are mainly concentrated in the Southeastern region and some are beginning to flourish in the Red river delta. These large-scale farms are operated by relatively well-off farmers.

Before 1960, food-processing factories for livestock products did not exist in Vietnam. The building of food-processing factories started with the importation of exotic pig breeds into Vietnam. During the 1960s and 1970s, many food processing factories and plants were built, but after the economic reforms of the 1980s they were closed down again because they ceased to be profitable due to bad performance and poor adaptability to prevailing market conditions. In the 1990s, many new food-processing factories were set up. According to the Ministry of Agriculture and Rural Development (MARD), at the end of 1999, there were 105 food-processing factories for livestock products with a total output of about 2.8 million tons/year. Among the 105 companies, 62 percent were privately owned, 22 percent were owned by the government, 12 percent were foreign-owned or joint ventures, and 4 percent were cooperatives. The majority of these companies have low output levels, 45 percent have outputs of less than 5,000 tons/year, whereas only about 10 percent have outputs of more than 50,000 tons/year.

Figure 1: Gross value of output in agriculture, Vietnam, 1990-2000.

National herds

Livestock production has developed rapidly but in varying degrees for different livestock species. In recent years, inventories of pig and cattle increased rapidly, but the number of buffalos only increased a little. In the Red river delta the number of buffalos has even been decreasing. Poultry industry developed rapidly between 1995 and 2000, with productivity increasing by a factor of 1.3. Table 1 shows that between 1990 and 1999, the average live weight of pig and poultry was growing annually at a fast rate of about 7.0 and 6.3 percent, respectively. Although live weight of cattle has also been increasing rapidly (at a rate of about 5.5 percent per year) during the same period, it should be noted that the larger part of this increase took place between 1995 and 1999 (at a rate of about 7.4 percent per year). Contrarily, the annual growth rate in the live weight of buffaloes was higher between 1990 and 1995 (about 4.7 percent) than in the period from 1995 to 1999 (about 2.7 percent).

Table 1: Growth rates of the live weight of various domestic animals, Vietnam, 1990-1999.

Species	Live weight (1,000 tons) 1999	Increase(%)		
		1990-1995	1995-1999	1990-1999
Pig	1,318.2	6.96	6.97	6.96
Poultry	261.8	5.35	7.44	6.28
Chicken	198.2	5.71	7.33	6.43
Duck	63.6	5.08	7.87	6.32
Cattle	85.5	3.95	7.41	5.49
Buffalo	46.2	4.69	2.68	1.42

Source: General department of statistics.

According to the International Food Policy Research Institute (IFPRI) and the Ministry of Agriculture and Rural Development (MARD), the increase in supply of live weight in Vietnam is mostly due to increases in the size of the national herd, rather than improvements in productivity. Productivity is defined as the output produced per head per year (based on slaughter weight). Productivity is high

when a high slaughter weight is achieved within a short production period. In 1999, average productivity levels reached about 70 kg for pigs, 1.5 kg for chicken, 210 kg for cattle, and 156 kg for buffaloes (Table 2). Cattle exhibited the highest growth rate in live weight at about 2.5 percent per year during the period from 1990-1999, followed by pigs (2.0 percent), buffaloes (1.0 percent), ducks (0.7 percent), and chicken (0.4 percent) (Table 2). With the exception of buffaloes, growth rates have been remarkable over the last five years, especially for cattle (4.5 percent) and pigs (3.1 percent).

Table 2: Livestock productivity ratio and growth rate in productivity ratio by type of domestic animal, Vietnam, 1990-1999.

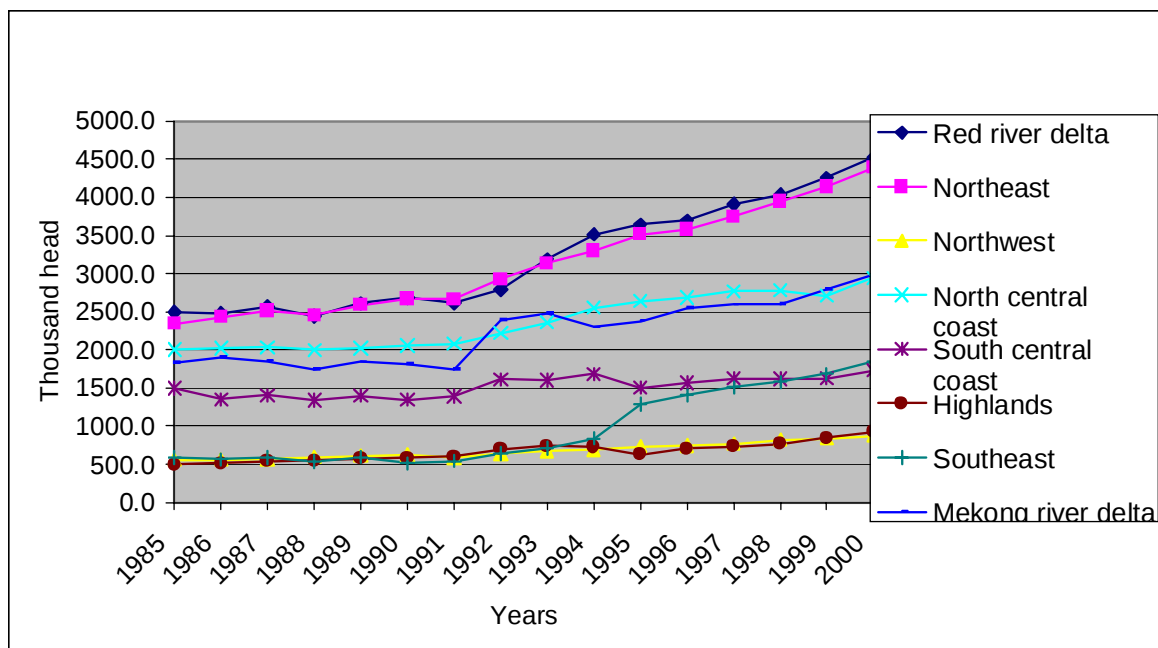
Type of domestic animal	Productivity 1999 (kg/head/yr)	Increase %		
		1990-1995	1995-1999	1990-1999
Pig	69.80	0.96	3.11	1.92
Poultry	1.50	-0.21	1.35	0.48
Chicken	1.50	-0.32	1.35	0.42
Duck	1.50	0.13	1.35	0.67
Cattle	210	0.82	4.49	2.45
Buffalo	156	3.93	-2.62	1.025

Source: General department of statistics, May 2000.

Increases in the proportion of crossbred and exotic animals in the livestock herd in Vietnam have been partially responsible for the increases in offtake rates over the past ten years. While the pig herd size has increased by 5 percent per year, the average production of live weight has grown at around 7 percent per year. The size of the national poultry flock increased at an average rate of 5.9 percent, and production (in live weight) increased at an annual average rate of 6.3 percent. This annual increase in offtake is in part due to an increased adoption of improved breeds with higher slaughter weights and earlier slaughter ages. Further increases in offtake rates are likely to be driven by increased adoption of exotic breeds by producers and improvements in the quality of crossbred animals used by farmers.

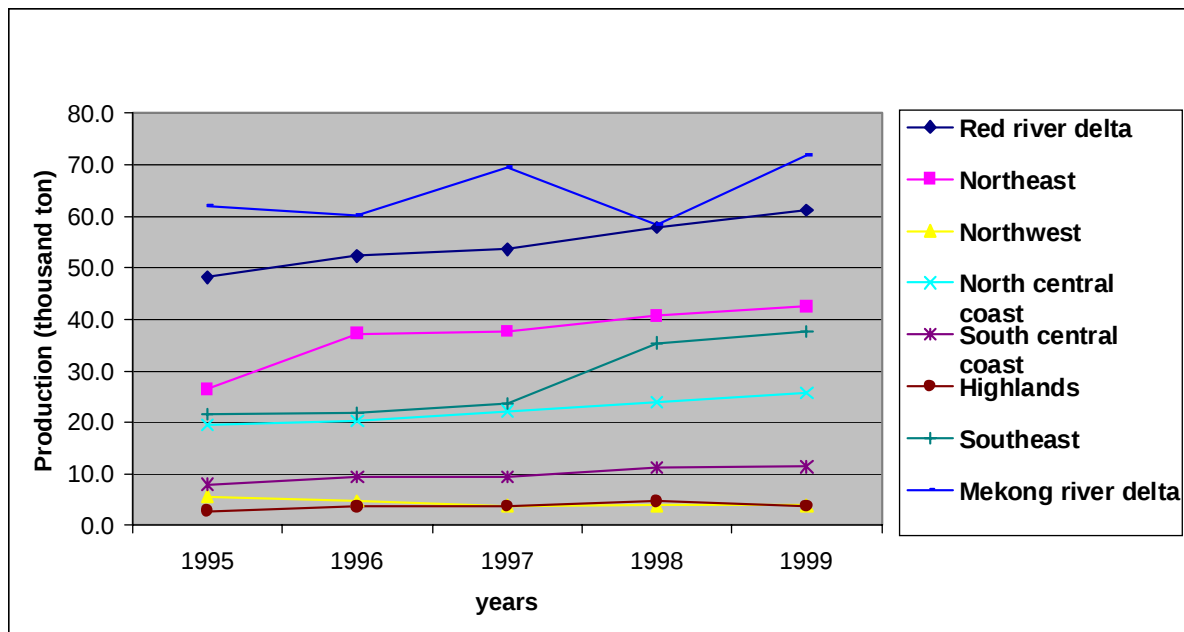
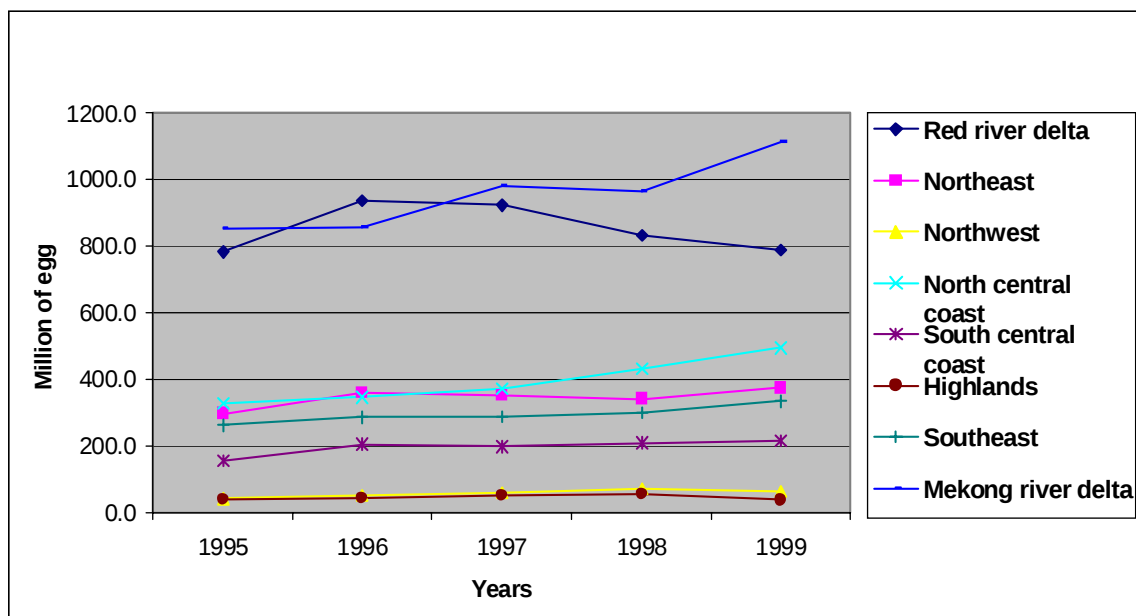
Pigs

The Vietnamese pig herd increased gradually over the past years. The number of pigs increased from 12 million animals in 1985 to 17 million animals in 1996, and 19 million pigs in 2000 (General Department of Statistics, Vietnam). The total live weight of pig also increased from 560,000 tons in 1985 to 1 million tons in 1998 and about 1.4 million tons in 2000 (General Department of Statistics, Vietnam). Figure 2 shows the distribution of pig production by region in Vietnam. During the last 10 years pig production has been growing rapidly in the Red River Delta, the Northeast, and the Southeast compared to the other regions of the country. The slaughter weight also clearly improved, from 45 kg/head in the past to 60 kg/head at present (Vu Trong Binh 2000). While the majority of smallholder households own from 1 to 4 animals, there was a marked increase in the number of pigs of up to 100 head owned by households in certain areas of the country.

Figure 2: Pig production by region, Vietnam, 1985-2000.

Poultry

The total poultry population in Vietnam amounts to 183 million birds, of which 140 million are chickens and 43 million are ducks, Muscovy ducks and geese. The chicken population of the Northern provinces is 91 million birds, or 65 percent of the total national chicken population. The majority of poultry are found in four regions, namely the Northern Mountains and Midlands, the Red River Delta, the North Central Coast, and the Mekong River Delta. These four regions account for almost 75 percent of all poultry. Duck production is mainly found in the two river delta areas. Figure 3 shows the distribution of poultry production (by live weight) across the different regions in the country. It is shown that poultry production has been increasing in general across the regions, but more rapid increases have occurred in the Southeast and the Red River Delta during the last 4-5 years. While there was a decline in production in the Mekong River Delta in 1997-1998, the trend has been reversed from 1998 to 1999. Together the RRD and MRD are the largest producers of poultry in the country. The duck, Muscovy duck and geese population is 15.2 million birds, or 35 percent the national duck population. While the chicken population is high, the production of eggs and meat is still very low (5-month old local chicken broiler live weigh is only 1.3-1.5 kg and local laying capacity is about 70-80 eggs/hen/year); which is about 1/3 the yield of the high-yielding breeds of chicken in other parts of the world. Figure 4 shows the distribution of egg production across regions in the country. Both the RRD and the MRD are big producers of eggs, with rising egg production in the MRD but decreasing production in the RRD. Chicken production in the north is using mainly the traditional system with about 20-30 chickens per family and largely based on local feeds. As a consequence breeding, feeding, shedding and health management are not receiving much attention. Farmers are generally faced with problems of diseases, high mortality, and low margins from chicken production.

Figure 3: Poultry production by region, Vietnam, 1995-1999.**Figure 4:** Egg production by region, Vietnam, 1995-1999.

Number of households which keep livestock

About 98 percent of all households in the Red River Delta keep livestock, according to a survey undertaken by VASI. While no similar documentation is available for the other regions in Vietnam, it is estimated that conditions are similar in the other areas.

Composition of the Industry

Pig industry

There are several existing pig production systems, namely, state-owned enterprises, private commercial pig farms, small-scale pig production systems, and integrated production systems.

State-owned farms account for 4-5 percent of the total pig production. These farms have played a crucial role in genetic improvement and disseminating techniques to develop larger scale pig production. These farms are scattered all over the country.

Private commercial pig farms produce about 15 percent of all pigs. These farms rear between 10 and 500 fatteners with 5 to 100 sows. Some farms only produce weaners, others only fatten pigs, and some do both. The private commercial farms are situated around Ho Chi Minh City.

Small-scale pig production accounts for as much as 80 percent of total production. Local breeds or crossbreds between local breeds and exotic breeds are used. Each farm keeps 1 to 2 sows and less than 10 fatteners. This system exists all over Vietnam, but is developed to a different extent in different provinces in the country.

An integrated system involving breeding stock, feed supply, fattening and slaughter processing is a recent development in pig production in Vietnam. Foreign companies are investing capital to build up these systems, each with a capacity of 20-200 thousand pigs. This development is strongest in Ho Chi Minh City because of the sharp increase in demand for pork meat in the richer south of Vietnam.

The level of development of the pig business around Ho Chi Minh City is different from that of the Red River Delta in terms of production systems (breed, genotype, feeding, size of stock farms) with fattening and distribution carried out on a much wider scale. However, the benchmark for all transactions be they technical or economic, is the same as those of the North, since these transactions are, in both localities, conducted through visual evaluation and underground sale. The players operate as individuals and the business is not organized into operators' associations. There is no system in place to ensure product quality along the commodity chain.

A number of large-scale players such as feed manufacturing and stock development companies as well as the VISSAN Company are currently active. This phenomenon also exists around the city of Haiphong but on a smaller scale. While these players at times enter into export agreements, the nature of the transactions with the other actors in the local market remains unchanged.

Vietnam South is not limited solely to Ho Chi Minh City. The stock farms outside the City seem to be endowed with a technical system more advanced than in the farms in the RRD outreach areas. However, the situation of the business, despite the differing technical levels, is the same in terms of level of organization of producers and transactions. With the exception of Dong Nai and the areas around Ho Chi Minh City, pig production and business in the Mekong Delta and other regions of the South do not significantly differ from those in the Red River Delta.

Poultry industry

Poultry production plays a very important role for rural development in Vietnam. Poultry production ranks second behind swine production, and accounts for 19 percent of the total livestock production. More than 80 percent of the poultry production in Vietnam is based on traditional production systems at the smallholder level. This explains its important role in the rural household economy. Apart from supplying the family with high quality protein, poultry also provides cash income through the sale of meat and eggs. In most cases the poultry are left scavenging during the daytime and are either kept indoors with the family, or in a separate hen house or with other livestock during the night. Even though all farmers keep chicken, there is little awareness about the management and daily care of chickens and therefore these production systems are often called 'low input – low output' systems.

There are now many families keeping flocks of 1,000 to 10,000 birds. In 1999, there were 136.1 million chickens produced, of which 101 million were local and exotic colored-feather chicken breeds

produced by the farmers. This amounted to a total value of nearly 2,000 billion VND² and contributed to poverty alleviation in rural and mountainous areas. From 1990 to 1999 the annual average growth rate of poultry production was 5.7 percent. The industrial production of poultry is commonly found in the Red River and Mekong River Deltas.

Three different farming systems for chicken production exist in Vietnam, namely, the traditional system (extensive system), the semi-industrial system, and the industrial system (intensive).

The traditional system is a scavenging or extensive system and has existed for a long time throughout Vietnam. The characteristics of this system are low initial investment, with chicken allowed to scavenge, looking for feed and breeding independently. The chicken house is simple. Chicken can be raised in the garden without fences. Rearing time is long; normally it takes 6 months for the chicken to reach slaughter weight. Due to the scavenging system, management input is low and the chickens easily contract diseases, suffer heat and cold stress, and consequently have a low survival rate. However, the advantage of this system is the low initial investment. Poor farmers can keep some dozens of chicken, and, although the system is not very productive nor producing a high income, it is adoptable by almost any household. The meat of chickens raised in this system is preferred by many consumers for its taste and obtains a premium price. This system produces about 65 percent of total broiler chickens or about 70 million birds per annum.

The semi-industrial system combines more advanced technologies with the traditional system. Nutrition and disease control are given more attention. Under this system, chickens are reared for sale. Chickens are reared by the batch with each batch containing 200 to 500 or even 1,000 birds. This type of system requires large areas, (at least 100 to 200 m² depending on the size of the flock) fenced by bamboo or steel wire, with space for the chicken to move around.

Investment is needed to build the chicken house, and facilities like feeders, drinkers and brooders for young chicks. Besides the naturally available feed resources such as worms, insects, vegetables, and grasses, chicken receive additional feed to reduce the rearing time and increase production. In villages along riverbanks or where there are large areas of unused paddy fields after harvest, chicken can be taken to the fields during the day. They gather the dropped grains and this reduces the cost of feeding. Compared to the traditional extensive system, chickens raised in the semi-intensive farming system have a higher growth rate, greater survival rates, and lower incidence of diseases. Time to reach slaughter weight is shorter, which means the system is more efficient in terms of feed use. In recent years, this farming system has been applied widely in the delta, hilly areas and in the suburbs of the big cities where the households have sufficient funds and more land area. Thousands of farms with a size of 500 to 2000 birds per batch have been built and 1-3 batches per year are raised. The exotic color feather chicken breeds like Jancun, Luong Phuong, Kabir crossbreeds are used in this farming system. About 10-15 percent of the total number of chicken (or about 14 million birds) in the country were reared in this system in 1999.

During the 70's and 80's, the industrial systems were state-owned enterprises, but by the end of the 80's and 90's some industrial chicken farms of small and medium size were established. These stock farms were often established through joint ventures or even 100 percent foreign investment, and companies such as the Viet-Thai Company, CP Group, Proconco, and Cargill have become involved.

Before the 90's, the industrial chicken breeds reared in Vietnam were Leghorn, Plymouth Rock, Hybro and BE. These breeds were provided by the Cuban Government. Since 1990, many parent stocks and commercial chicken breeds have been imported to Vietnam such as the meat types from Arbor Acres, ISA-MPK, Avian, Ross 208, Lohmann Meat, and layer breeds such as Goldline, ISA Brown, Hyline, Brown-Nick, Babcock B-380 which led to the diversification of chicken breeds in Vietnam. In addition, some colored feather chicken breeds reared by the industrial farming system were also imported into Vietnam, such as Sasso, Kabir, ISA-JA57, (Jancun) Three Yellow 882, L-ng Ph-ing etc.

Although the industrial system was established in 1974, it is not as well developed as in other countries in the region. It is still very weak and faces problems regarding breeds, housing and feeding. In 1988, the industrial chicken farming system had to cope with big price changes associated with new managerial arrangements, and there was a large decrease in chicken, meat and egg production,

² Current exchange rate is US\$1 = 15,000 VND.

especially in the period of economic reforms during 1989-1991. At that time, many state-owned enterprises suffered losses and were on the edge of collapse.

From 1992 to 1995, livestock and poultry production recovered quickly due to changes in the market conditions. Since 1996 when strong competition arose between many small and large companies (both local and foreign) the industrial chicken system has again had a difficult time. The emergence of many foreign investors, with the potential to provide investment, new technology, and marketing support led to a decrease in the market share of state-owned companies. The market share of the state-owned companies decreased from 36 percent in 1995 to 15 percent in 1999, with the remaining market share held by joint-ventures or fully-owned foreign companies.

The industrial poultry farming system in Vietnam is not yet fully integrated across all production levels. The state-owned companies, joint ventures, or fully-owned foreign companies import eggs and day-old chicks from overseas. Broiler chicken production is carried out by private farms or households, which are still financially weak and lack access to technology, health care, and marketing skills. Additionally, the Vietnamese consumers have not become accustomed to using readily processed chicken and eggs yet. Market supply of poultry products has not steadied yet and this has discouraged consumption. Thus, industrial production has not proved to be very successful. In addition, there are many other shortcomings in housing, equipment, management skills, technology, and the quality of the breeds used. Therefore, there will continue to be difficulties in state-owned and other companies. However, the industrial chicken and egg production in Vietnam is likely to grow as the above problems are solved and it is foreseen that the industry will follow a similar growth path as in the other countries in the region.

There are large variations in the breeds of chicken used in Vietnam. The local chicken breeds and the exotic color feathered chicken breeds are popular in the regions of North East, North West, North Central Coast, South Central Coast, Central Highland, and Mekong River Delta. In the Red River Delta and North East of Southland, the proportion of the scavenging chicken breeds to the commercial chicken breeds is 60:40. Overall, local breeds (Ri, Ri Pha, Mia, Dong Tao, Ho, crossbred and color feather chicken breeds for extensive rearing) comprise nearly 70 percent of the total number of chickens, the remainder being commercial chicken breeds for intensive rearing.

Poultry meat production

Corresponding to the increase in bird numbers, the amount of chicken meat produced increased in all agro-ecological regions. In 1988, 102 thousand tons of chicken meat were produced whereas in 1998, 175 thousand tons were produced, an increase by a factor of 1.7. This represents an annual increase of 7.34 thousand tons. The RRD region produced most of the chicken meat, about 28 percent of total production, followed by the North East which produced another 22 percent. The MRD accounted for about 16 percent of total production, while the North East of Southland had about 11 percent.

The MRD is famous for its duck production with its duck population comprising more than 50 percent of the duck flock of the country. Due to different socio-economic conditions and technical skills of the people in the different regions, the investment in and efficiency of chicken production is very varied. In the remote areas of the North East, Central Highlands, and North Central Coast, chickens are often reared by grazing and making use of agricultural by-products. In the delta regions and suburban areas, e.g., the RRD and the North East of Southland, chickens are reared in a more intensive manner with greater economic efficiency. In these latter areas the use of exotic breeds, industrial feed, and advanced technologies is more than in the remote areas.

Contribution to Household Income

Table 3 shows the contribution of livestock to gross agricultural income by farm size. Livestock accounted for a large proportion (80 percent) of gross agricultural income. This was most evident for large farms, which receive 95 percent of gross agricultural income from livestock production. In small farms, the share of livestock was 75 percent.

Table 3: Share of gross income from livestock to total agricultural income, 1999.

Farm Size	Livestock Gross Income as a Share of Total Gross Agricultural Income
Small Farms	74.96
Medium Farms	90.43
Large Farms	94.97
All Farms	80.10

Source: IFPRI-MARD survey 1999.

A survey of households in the RRD shows that income from pig production (fatteners or weaners) accounts for a share of 9 to 41 percent of total household income (Table 4). The highest contribution was observed for households with a relatively large number of pigs. The lowest contribution was observed among households that were also engaged in rice production. For the latter, it is possible that rice production was the main activity in the farm.

Table 4: Typology of households in Red River Delta

Type of pig sold	Piglets		Meat pigs					Half-raised
Scale of pig raising			Less than 6		More than 6			
Rice sale	No	Yes	No	Yes	Yes	No		
Type	A	B	C	D	E	F	G	H
Number of meat pigs/year	-	-	3	3	7	9	24	326
Weight of pigs (kg/head)	-	-	73	64	76	82	92	25
Price of pig (đồng/kg)	-	-	8 387	8 811	9 261	9 530	8 974	10 948
Cost of feeding (đồng/kg)			2 345	2 437	2 228	2 466	2 004	2 017
Cultivated land/person (m ²)	1 550	610	430	790	1 010	610	400	180
Quantity of paddy sold/year (kg)	-	722	-	1 012	632	-	~	-
Paddy selling price (đồng/kg)	-	2 699	-	2 240	2 313	-	-	-
Paddy yield (kg/sao)	151	170	170	168	170	180	171	156
Paddy production/person (kg)	593	536	362	631	727	515	335	90
Quantity of piglets sold/year (kg)	381	293	~	~	~	~	~	~
Weight of piglet (kg/head)	12.1	10.6	~	~	~	~	~	~
Price of piglets (đồng/kg)	11 798	11 655	~	~	~	~	~	~
Income/person (1000 đồng)	1 915	1 345	1 047	1 417	2 365	1 372	2 984	3 008
Income from rice	26%	54%	40%	52%	41%	49%	17%	4%
Income from meat pig*	-	-	~	~	-	~	15%	41%
Income from piglet*	17%	9%	~	~	-	~	~	~
Income from other agricultural activities	43%	15%	23%	14%	15%	32%	5%	2%
Inc from food trade or processing activities	4%	-	12%	2%	-	-	55%	47%
Income from other non-agricultural activities	3%	10%	14%	25%	31%	16%	5%	6%
Other Incomes	8%	12%	11%	8%	12%	3%	3%	-
Estimated proportion in total population	< 5%	< 5%	10%	50%	< 5%	< 5%	15-25%	< 5%
Number of surveyed households	4	7	17	40	9	9	21	5
Main location: provinces of Ha Tay (HT) and Nam dinh (ND)	HT 75%	HT 43% ND 57%	ND 65%	ND 70%	HT 80%	HT 78%	HT 75%	HD 100%

Source: (VASI), CIRAD – Ecopol project

A survey of households in Quoc Tuan commune in Hai Duong indicated that income from livestock was an important component of household income, accounting for about 20 percent in 1988 and increasing to about 32 percent of total household income in 2000. Within income from livestock production, the contribution of pig production was between 20 and 29 percent during the period from 1997 to 2000 (Table 5).

A similar survey in Thai Tan commune in Hai Duong indicated that income from livestock production ranged from about 26 percent to 39 percent with income from pig production accounting for between 19 and 20 percent in 1997 and 2000, while the contribution of cattle only amounted to about 2 percent. (Table 6)

Table 5: Structure of average income of households in Quoc Tuan, 1988, 1993, 1997, 2000.
(Units expressed in percentages.)

Source of Income	1988	1993	1997	2000
Total income	100	100	100	100
Income from rice	32.26	27.09	21.27	20.40
Income from animal husbandry	19.58	17.24	32.62	32.30
<i>Pigs</i>			28.92	20.19
<i>Poultry</i>			3.70	11.77
<i>Cows</i>				0.33
Income from off-farm activities	12.53	13.87	14.73	15.10
Other income	35.63	41.80	31.38	32.20

Table 6: Structure of average household's income in Thai Tan commune, 1988, 1993, 1997, 2000.
(Units expressed in percentages.)

Source of Income	1988	1993	1997	2000
Total income	100	100	100	100
Income from rice	28.22	30.55	31.66	22.64
Income from animal husbandry	39.31	31.96	26.04	33.09
<i>Pigs</i>			18.94	19.88
<i>Poultry</i>			7.10	11.04
<i>Cows</i>				2.18
Income from off-farm activities	12.22	11.56	5.57	8.97
Other income	20.25	25.94	36.73	35.30

Source: Dao The Anh, 2003.

Structure of Farms

Livestock production has evolved over the years into three types, namely the subsistence type, the semi-commercial type, and the commercial industrial type.

The subsistence type is largely based on the crop production activity of the farm, with animals subsisting on the by-products from crop production. This system has been the basis of household livestock production in the North and the Central region over many years. This system is still popular but its importance has recently been decreasing. In Haiduong province, for example, pig production under this system accounts only for about 20 percent of pig production in the area. However, its share is somewhat higher in Ha Tay province, about 30 percent, and around 70 percent in Namdinh province. According to studies conducted by the Vietnam Agricultural Science Institute (VASI), smallholders mostly produce from 2 to 5 pigs per year. This mode of pig production has very little or no

linkage to the market, but rather is closely integrated with the crop production of the households because of the use of manure for fertilizing fields and the use of some crop by-products for feed.

In the semi-commercial type, production decisions are based on market price information for animal feed and livestock products. The number of pigs raised has increased to hundreds of animals yearly over the last decade. The majority of households engaged in this production system are likely to become more specialized in livestock production. These households are relatively predominant in many rural areas, but in varying proportions depending on the region. In Haiduong province, about 36 percent of all households have between 20 and 60 fatteners per year and about 3 percent of all households raise more than 60 animals per year. In Ha Tay province, around 60 percent of all households engaged in pig production raise more than 60 animals/year. Of these households, about 10 percent are raising fatteners. In Namdinh province, this proportion is about 20 percent. In the RRD, smallholders are constrained to increase the number of animals produced to hundreds of head/year because of the limitations in land area. On average, households own an area of only about 500 m²/household. Even within this type of production system, there is diversity in management across households. Some households use mainly feeds produced at home, while other households mainly buy feed from the market. Some households consider this activity as a secondary activity. Generally speaking, households that are operating at a relatively larger scale often also carry out other production activities such as the processing of agricultural products that support livestock activity. Currently, only few households have a well functioning livestock production, some even manage without the support of other production activities. The number of households that have managed to link their production operations closely to the market is also still limited.

For those households keeping poultry under the semi-commercial system, improved poultry breeds (foreign strains or crossbreds) are being used. These households breed and sell poultry in batches. They often have close relations with the breed companies that supply them with feeds. Likewise, they have ties with wholesalers and large companies. The size of these farms ranges from hundreds to thousand of birds.

The commercial/industrial type differs significantly from the household-based system. These farms employ more labor and capital is provided by foreign companies such as CP, Proconco, and Cargill, among others. Many farms of this type produce mainly for export. The large farms have some comparative advantage over the household-based system because the large farm has the ability to sell a big number of pigs on a regular basis and in accordance with the quality requirements of big companies. This arrangement is known as contract growing³ and is a form of economic contract that is common in many developed countries. Farms engaged in this arrangement are highly dependent on foreign companies for investments. The increase in the number of these contract farms will most likely result in the domination of the Vietnamese meat market by foreign companies unless more equitable institutional arrangements can be put in place. Under the current scenario, millions of smallholder households will lose their market share and subsequently become employees of these large firms if prevailing arrangements persist. In the situation where livestock plays an important role in the income of the majority of small farmers and where the industry and service industries can not yet attract labor, the market domination of these foreign companies will cause the disappearance of household-based livestock production which until now is the backbone of the livestock sector in Vietnam.

In the past, the government has made large investments in the development of the pig and poultry breeding system, especially in the development of large-scale farms to serve as a model for livestock production development in Vietnam. Some state-owned large-scale projects included investments in large scale farms. However, the success of these farms has been highly unstable because it is highly dependent on foreign companies. Because of the huge investments needed, the development of farms of this scale will never be suited for the millions of pig and poultry rearing households in Vietnam.

³ Contract growing is an arrangement between an individual grower and a company (usually engaged in feed milling or meat processing) for the former to undertake production activities, like the fattening of pigs to a specified weight, with the company providing all the inputs and other technical support. The company buys the output of the grower at a specified price depending on whether the grower has met certain product standards required by the company. In most cases, the grower is only required to provide some housing facilities for the animals and/or labor.

Economics of Production

A study by IFPRI and MARD has shown that diseconomies of scale exist in poultry and pig production. The study estimated economies of scale by regressing the log of size (in terms of animal revenue and in terms of animal inventory) against the log of profits:

$$\text{Log (profit)} = a + b \log (\text{size})$$

If the coefficient of $\hat{a}$ was positive and less than 1, the industry was considered to have diminishing returns to scale. On the other hand, if the coefficient of $\hat{a}$ was positive and greater than 1, then the industry exhibited increasing returns to scale. The estimated coefficients in the IFPRI study are shown in Table 7. All estimates of $\hat{a}$ for pig and chicken production systems were positive and less than 1, which means that there were diseconomies of scale in both production systems.

Table 7: Estimated Coefficients of Return to Scale Equation

Animal Type	Dependent Variable	Independent Variable	$\hat{a}$	$\hat{b}$
All animals	Log (Livestock Profit)	Log (Livestock Revenue)	0.165	0.887
Pigs	Log (Livestock Profit)	Log (Livestock Revenue)	0.419	0.864
	Log (Livestock Profit)	Log (Pig Inventory)	7.47	0.664
Poultry	Log (Livestock Profit)	Log (Livestock Revenue)	0.63	0.827
	Log (Livestock Profit)	Log (Poultry Inventory)	5.66	0.670

Source: IFPRI. 2001. Policy Options for Using Livestock to Promote Rural Income Diversification and Growth in Vietnam.

Results of the study revealed that profits were increasing at a slower rate than inventories and revenues. This implies that the efficiency levels of smaller farms, based on raising local animals with low cost feedstuffs are higher than those on larger farms employing intensive high quality feed production techniques.

Table 8 shows sample budgets for raising pigs. The analysis shows that raising pure Mong Cai pigs to slaughter weight of more than 25 kg is not profitable. Male pigs from multiplication herds are better slaughtered as piglets in order to increase profits.

Raising crossbred pigs for slaughter, on the other hand, provides a reasonable profit. However, this profit is dependent on the quality of the pigs. A study made in the RRD indicates that the feed conversion ratio (FCR) varies from 3.4 to 3.8 kg feed/kg gain. In the analysis, slightly more pessimistic FCRs of 3.5 and 4.0 were used. With 3.3 pigs going through a pen per year, the profit ranges from VND 419,000 to VND 620,000 per year for a single pig pen. However, if the price for slaughtered pigs is less than VND 10,000/kg, there is no or very little profit unless the production cost can be reduced. The Mong Cai sow producing 1.8 crossbred litters provides an estimated profit of around VND 660,000/year.

Table 8: The economics of smallholder pig production, Vietnam.

Description of Item	Cost (VND)	
Pure Mong Cai piglet, slaughtered at 25 kg.		
Input:	253,500	
1. Mong Cai piglet	150,000	
2. Vet service, vaccination	4,500	
3. Feed (10 kg gain @ 5.5 kg feed)	99,000	
Output:		
1. Slaughter price	275,000	
Profit per pig	21,500	
Profit/year/pig (1.8 litters/year)	38,700	
Mong Cai x Large White crossbred piglet	FCR = 3.5	FCR = 4.0
Input:	581,850	642,900
1. Crossbred piglet	150,000	150,000
2. Vet service, vaccination	4,500	4,500
3. Feed: 55 kg gain @ 4 kg feed	427,350	488,400
Output:	770,000	770,000
1. Slaughter price	770,000	770,000
Profit per pig	188,850	127,100
Profit per year (3.3 pigs)	620,895	419,430
Mong Cai sow		
Input:	1,605,300	
1. Mong Cai, 70 kg	770,000	
2. Insemination	9,500	
3. Feed, pregnancy, 228 kg	410,400	
4. Feed, lactating, 125 kg	225,000	
5. Feed, empty, 10 kg	18,000	
6. Feed, piglets, 12 kg/pig	172,800	
Output:	1,970,000	
1. Piglets @ 15 kg	1,200,000	
2. Value of sow	770,000	
Profit per sow and litter	364,700	
Profit per sow per year (1.8 litters/year)	656,460	

Note: Exchange rate: 15,000VND = 1US\$

Source: Adapted from Ministry of Agriculture and Rural Development, Vietnam.

Table 9 illustrates the economics of poultry production under different systems. The simple calculations show that even with rather low yielding animals, it is possible to make profit from poultry production. However, other costs might have to be included depending on the degree of sophistication of the production system.

Table 9: Economics of smallholder poultry production, Vietnam.

Description of Item	Cost (VND)
Broiler production	
Input:	23,750
Day old chicks	3,500
Vet service, vaccination	4,500
Feed: 90 days @ 0.05 kg /day = 4.5 kg	15,750
Output:	36,000
Slaughter price	36,000
Profit per chicken	12,300
Profit per year (3.6 chickens)	44,280
Egg production, semi-scavenging (half feed)	
Input:	78,362
Laying hen, 18 weeks	30,000
Feed: 365 days @ 0.05 kg / day = 18.25 kg	48,362
Output:	160,000
Eggs (200 per year)	160,000
Profit per hen per year	81,638
Egg production, intensive	
Input:	157,750
Laying hen, 18 weeks	30,000
Feed: 365 days @ 0.10 kg /day = 36.5 kg	127,750
Output:	240,000
Eggs (300 per year)	240,000
Profit per hen per year	82,250

Note: Exchange rate: 15,000VND = 1 US\$

Source: Ministry of Agriculture and Rural Development, Vietnam

Cau (1995) has set up the following scheme with estimations on the distribution of costs:

	Cost structure: eggs (%)	Cost structure: chicks (%)
Feed	70-75	60-65
Breeders	18-20	20-25
Medication	1.5-2.0	3.5-4.0
Electricity, water, consumables	1.0-1.2	2.0-3.0
House depreciation	1.2-1.5	1.5-2.0
Deaths		4.0-5.0
Labor	1.5-2.0	2.5-3.0
Other costs (operations, interest, tax)	1.0-2.0	1.0-2.0

Marketing Channels

The marketing (product flow) for cattle, pig and chicken presented in this section is based on an IFPRI report, which surveyed meat and livestock marketers. The sample consisted of 406 meat and livestock marketers, which including 90 traders, 150 wholesalers and 166 retailers. The sample was drawn from all regions of Vietnam.

The marketing channels for slaughter cattle are shown in Figure 5 which gives the percentages of cattle sold through different channels. The cattle marketing system is composed of four middlemen, namely the trader, wholesaler, slaughterer and retailer. Live cattle are sold to wholesalers and retailers while carcasses and meat are sold to retailers or directly to households.

Figure 6 shows the marketing (product flow) for pigs. Similar to the cattle marketing channel, the pig marketing system is composed of four middlemen. These are the traders, wholesalers, slaughterhouses/meat processors, and the retailers. Live pigs and piglets are primarily sold to traders, wholesalers and slaughterhouses while pig carcasses and other meat products are usually sold to retailers or directly to consumers.

The product flow/marketing flow for chicken is shown in Figure 7. The marketing channels in the chicken marketing system are similar to those of the pig marketing system. Live chickens are usually sold to wholesalers and retailers, while carcasses are sold to wholesalers, retailers or directly to customers.

Figure 5: Slaughter cattle marketing channels (numbers represent percentage of sales through channel)

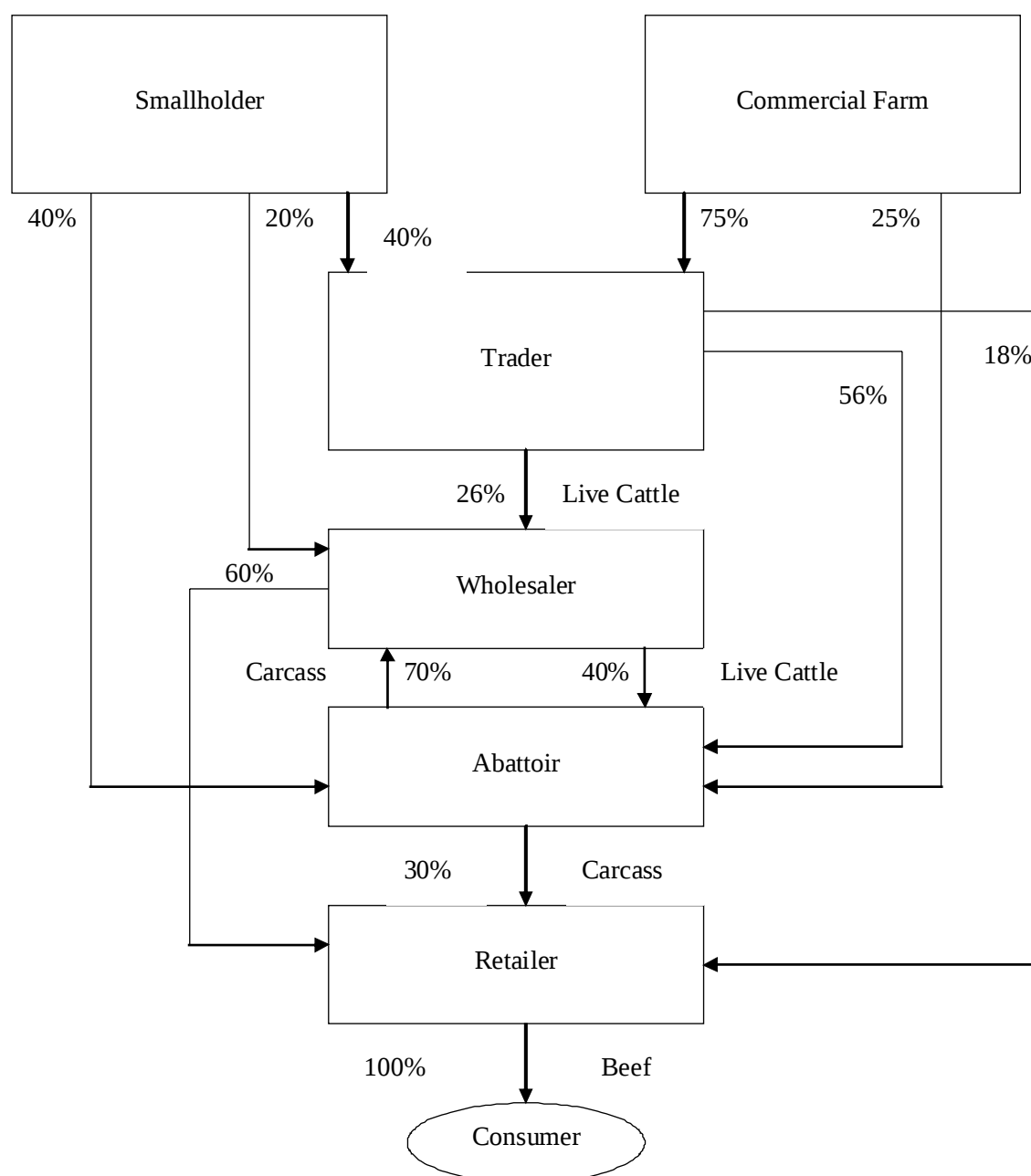


Figure 6: Slaughter pig marketing channels (numbers represent percentage of sales through channel)

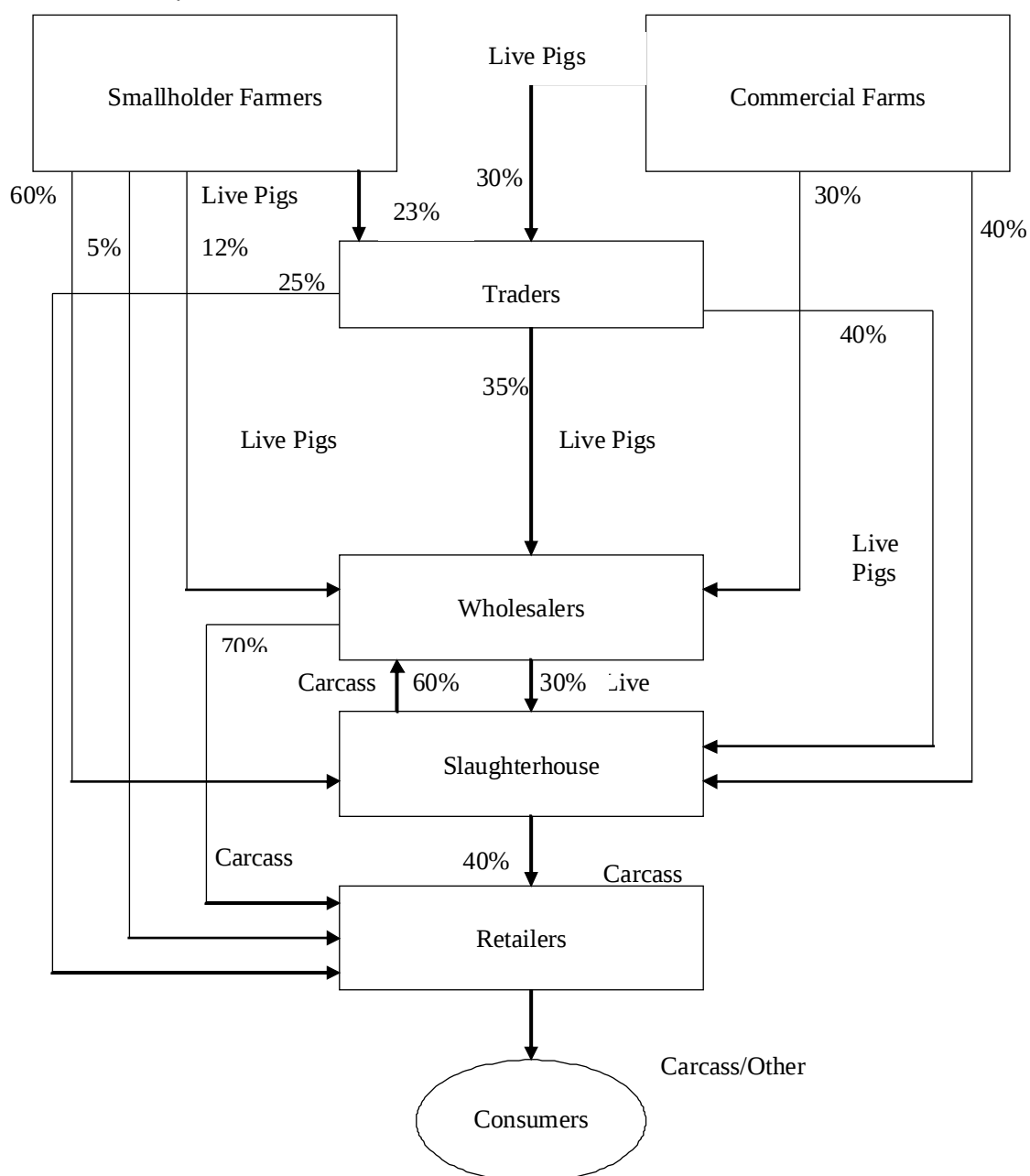
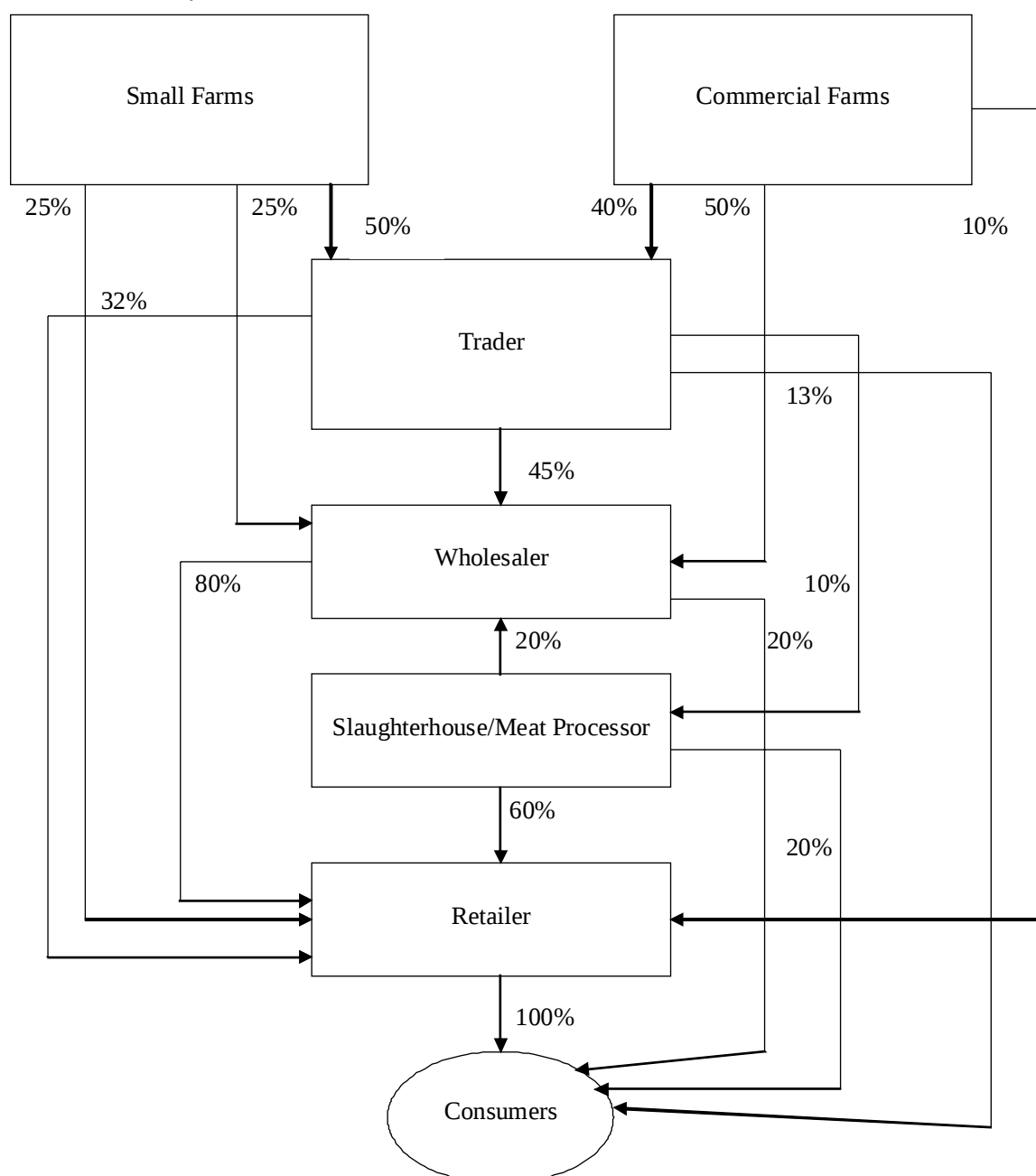


Figure 7: Slaughter chicken marketing channels (numbers represent percentages of sales through channel)



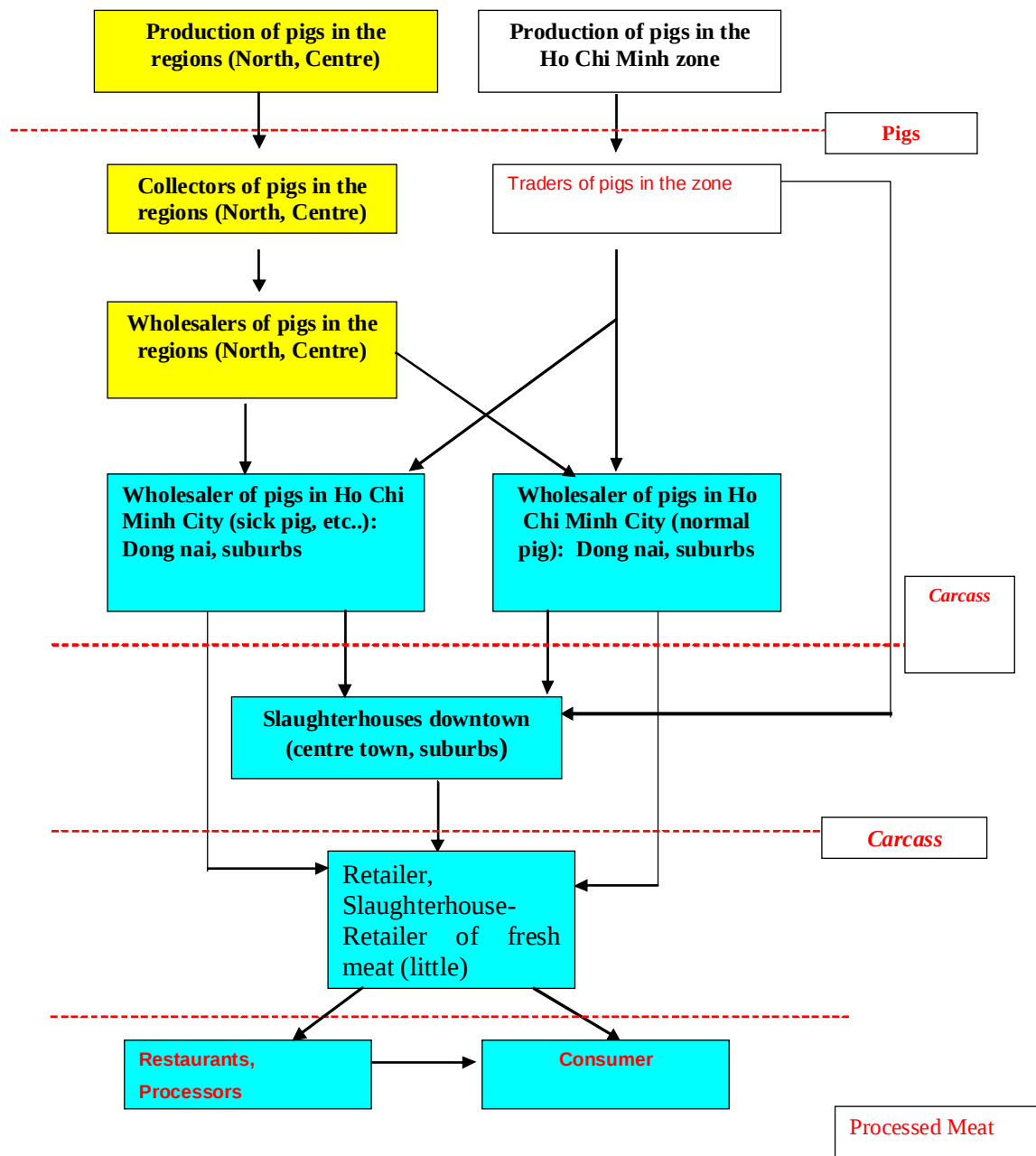
Commodity flow for pigs

The market agents are small-scale operators, which operate within a network of channels from production to consumption. These private agents are the major suppliers of meat for the market. There are some government companies that are also engaged in this field, namely VISSAN in Ho Chi Minh City, and ANIMEX, among others. Being of much larger scale, the activities of these government companies concentrate mainly on the export market and receive government assistance. Only VISSAN plays an important role in supplying meat for the Ho Chi Minh City market. In recent years, private companies have started to engage in the pork export market in the southern region, as well as in Haiphong and Namdinh provinces. There are slaughterhouses in Hanoi and in Ho Chi Minh City that serve the domestic market; however, these are not officially registered and hence, are not properly monitored by the government. Consequently, the risk of their spreading contagious diseases due to inappropriate hygiene conditions prevailing at their facilities has not been assessed. Moreover, due to their unregistered state they are able to avoid the payment of government taxes.

In its current state, the commodity chain for pork in Vietnam has no clear legal standing. The prevalent organizational set-up in pork trading often is beyond the control of the government. This situation creates many difficulties in the exchange process and limits the further development of the commodity chain. Firstly, it does not differentiate between official vis-à-vis unofficial institutions, so that in many instances, government assistance has been re-directed to intermediate government companies more than to the smallholders for whom the assistance was originally intended. The government companies, on the other hand, receive export quotas although they also depend on the network of private collectors to buy pigs. Most of these companies have been provided investment support by the government, despite only making a small contribution to livestock production and the development of the sector.

The following sections give details of the structure and activities that prevail with regards to the pig commodity chain, including the various actors in the chain. The focus lies on the Mekong River Delta in South Vietnam, where pig production is a rapidly growing industry. Figure 8 illustrates a sample of an existing marketing flow of pigs in the Mekong River Delta; in this case Ho Chi Minh City.

Different types of individual collectors are to be found in the Mekong River Delta pig production sector. They operate underground or without legal personalities, and exhibit the same characteristics as the collectors of the North. All transactions are undertaken without sanitary and carcass quality control. One large State Company, VISSAN, handles collection, slaughter, meat processing and marketing single-handedly. However, the quantity collected by this company accounts for only a modest proportion of the large market of the South. VISSAN's collection modality is similar to that used by other collectors, procurements being based on visual assessment of animal body weight and condition.

Figure 8: Product flow of pigs in Ho Chi Minh City, according to Vu Trong Binh 2002

A typical sales negotiation between a pig producer and a collector can be described as follows, according to Vu Trong Binh 2002

- Pig quality is determined visually, like in the North, with physical appearance (or shape) and breed type as yardstick.
- Purchase by weigh band estimate is common (no weighing), but many producers also practice weighing at the moment of sale.
- Sales are carried out in batches, and transportation is done in small trucks or motorcycles.
- Individuals or groups organize sales, and the collector searches for offers by telephoning the producers or visiting families.
- Pig quality requirements are a lot higher than those observed in the North. Pigs with high fat ratio are difficult to sell.
- The most sought selling weight falls between 80 and 100 kg; beyond this margin, the price goes down. Pig weight therefore plays a significant role in the fixing of price.
- All estimates are based on live pigs.

The selling price ranges from 14,500 to 16,500 VND per kg live weight, with the overall weight falling between 80 and 100 kg. The carcass sells for between 21,000 and 22,000 VND/ kg.

In brief, initial transaction is dependent on ad hoc negotiations; it is not regulated by any prior agreement. All transactions are done on an individual basis. Not even VISSAN receives its pig supplies on agreement-based relations. There is no sanitary and quality control during initial transaction. And, lastly, there are no differences in taxes imposed by State agents on activities for different operators concerned.

Transactions between the wholesaler and local collectors ensure the transportation of pigs from other provinces and the central areas of the country to Ho Chi Minh City. Pig evaluation is based on physical appearance, health status of the animal, etc., which are the same standards as observed at Haiphong. Delivery is organized through oral commitment, and information is exchanged by telephone.

The quality of the pigs originating from the Central and Northern parts of the country is considered as inferior to that of pigs in the South; the price is about 13,000 VND per kilo (60 kg live weight), while carcasses cost 18,000 VND/kg. The live animal is used as basis for pig evaluation.

The Ho Chi Minh City slaughterhouses are better organized than those in Hanoi and Haiphong. Slaughtering follows a coordinated work chain, and the abattoir space is divided by function: bleeding, hair removal, gutting, primary cutting and sanitary control. Sanitary control is normally carried out by one veterinarian (or two in the case of large slaughterhouses) from the city's Veterinary Department.

Abattoir charges and taxes consist of:

- 7,000 VND: Slaughtering fee
- 5,000 VND: Electricity, slaughterhouse space, charcoal, etc.
- 1,000 VND: Pig washing prior to slaughtering
- 4,000 VND: Sanitary control
- 2,000 VND: Transportation of carcass to the market

The collectors may or may not ensure the slaughter of their pigs, depending on the abattoir. They collect their animals in batches, like the wholesale collectors that operate in Haiphong. The negotiation about the carcass price between collector and retailer is based on the live pig with price adjustments after slaughter. This practice is also observed in Haiphong.

The number of animals slaughtered in an abattoir reaches a maximum of between 50 and 100 pigs in one day. The quality of carcasses delivered from slaughterhouses is differentiated as follows:

- Pigs from the Central areas: net weight of around 45 kg; lard thickness: 18-20 mm measured from a point after the last rib; lard thickness beneath the sirloin: 20-22 mm.
- Locally produced pigs: net weight of around 70 kg; lard thickness 18 mm, measured from a point after the last rib; lard thickness beneath the sirloin: 20-22 mm.

Slaughterhouses in other areas of Can Tho as well as in the countryside were also visited and it was observed that slaughterhouse structures are identical to those in the RRD.

Once the carcass has been delivered by the slaughterhouse, price negotiation between the collector and the retailer is based on weight, physique, and sanitary status of the live pig. Prices may or may not be adjusted after examination of the carcass.

The VISSAN Company delivers the carcasses to retailers for a standard initial price. However, depending on the condition of the pigs, this initial price is subsequently adjusted by the retailers. The selling price is fixed for the carcass, but generally there are no objective criteria for evaluating pig carcasses.

The primary and secondary cutting of the carcasses is carried out in the market. Primary cutting entails separation of pieces of carcass, while secondary cutting involves separation of tissue types such as lean meat, fat, etc. The primary cutting at Ho Chi Minh City clearly determines the meat parts on offer: lean ham, steak, breast, ham, knuckle of ham without bone, sirloin and others. Hardly on sale are combined meat types (fatty meat and lean meat) like the piece of ham seen in Hanoi. Ham contains very little fat; its fat level must be below 5 mm.

Pigs from the North and Center of the country are marketed in the suburbs of the City, under very clean conditions. An area of the market is reserved for the sale of pork. Marketing conditions are much better than those in the city of Hanoi and should be copied. The meat sale outside the cities of the South has the same characteristics as in the countryside of the North.

The purchase of protein-rich animal or vegetable foods (mainly pork, chicken, fish, bean curd or tofu, peanuts but very little milk products) amounts to a total of about 100 kg per person per year in cities, and between 50 and 60 kg per person per year in rural areas. Pork represents 30 to 50 percent of these figures based on a household survey. The average quantity bought per family per day is 300 – 500 g of lean meat and 500 – 1,000 g for other kinds of meat and bone.

High-quality meat is defined by the following criteria:

- color: clear red
- tender, humid (surface not dry)
- white fat
- low level of intra-muscular fat
- soft, thin skin
- clear skin color without abnormal blemishes
- pork taste (less marked than previously)
- bland odor

The quality of the seller is rated based on the following criteria:

- Seller: good appearance, tidiness
- Venue of sale: in the market (where pigs are subject to sanitary control)
- Height of sale counter: above one meter

- Surface of counter: metal sheet
- Meat packaging: paper, magazine, cellophane (nylon) bag: buyers are unaware of the problems related to the use of papers such as school pupils' exercise books or newspapers for packaging.

Marketing Margins

The marketing margin is the difference between the revenues from the sale of products and the cost incurred in running the market operation. These costs include the cost of procuring the product, labor costs, and non-labor costs.

An analysis of price margins among 16 different markets all over the country over the period of 1994-98 revealed that price margins are relatively high and do not show convergence between regions (IFPRI 2001). The analysis of regional price margins for different types of meat provides an indirect test for market integration. The results indicate that there is no tendency for regional prices to converge. For some regions, there are indications of a divergence of prices, as in the case of chicken live weight in the Northern and Central regions and beef topside prices for the Central region. Margins are highest in the case of pigs, and lowest for poultry (chicken and duck).

Traders have higher average margins than wholesalers and retailers (Table 10). Although retailers have the lowest absolute margins, retailer's margins are the highest in terms of percentage of sales value (5.82 percent).

Table 11 shows the average margins by specialization and marketer type. The pig traders, wholesalers and retailers had the highest average absolute margins compared to the other animal categories. In terms of percentages of sales values, cattle traders and retailers had the highest average margins. On the other hand, duck wholesalers had the highest average wholesaler margins as proportion of sales.

Table 10: Average marketer costs and margin levels by marketer type across species (D'000)

Business type	Procurement value	Total cost	Sale value	Margin	Margin as percentage of sale value
Trader	1,798,494	52,252	1,931,675	80,919	4.19
Wholesaler	1,696,765	51,566	1,807,308	58,630	3.24
Retailer	361,348	9,562	393,836	22,926	5.82

Source: IFPRI. 2001. Policy Option for Using Livestock to Promote Rural Income Diversification and Growth in Vietnam.

Table 11: Average margins by specialization and marketer type (D'000)

Business Type	Pig Marketer	Chicken Marketer	Duck Marketer	Cattle/Buffalo Marketer	Multi Product
Traders	117,548 (3.91)	23,652 (3.95)	22,305 (5.69)	73,792 (6.25)	18,703 (3.65)
Wholesalers	86,897 (3.36)	10,491 (2.00)	22,630 (3.94)	31,360 (3.01)	-
Retailers	26,099 (5.96)	16,299 (5.36)	11,057 (4.12)	23,975 (8.53)	-

* - figures in parentheses represent the margins as a percentage of total sales value

Source: IFPRI. 2001. Policy Options for Using Livestock to Promote Rural Income Diversification and Growth in Vietnam.

Trade Flow Patterns

Domestic trade

Most of the trade takes place locally, with most farmers selling at the farm gate, as they do not have access to organized markets and auctioning systems. As a result, information about markets, prices, and other supporting information is limited. The lack of a widespread system of organized live animal markets in Vietnam means that the majority of marketing and distribution of live animals and animal products is undertaken through a network of marketers operating in informal groupings and often undertaking exchanges on a face to face basis. Traders tend to be the link in the marketing chain transporting the product from the farm-gate over the longest distance. The development of the marketing system in the previous ten years has created many steps between production and the end consumers of livestock products. This is specifically illustrated by an example of the marketing channel for pigs in the Mekong River Delta.

A study of marketing transactions that prevail in the Mekong River Delta showed that live pigs that are produced in North and Central Vietnam and other areas are generally sold to collectors who then sell them to traders in these areas. These traders then bring the pigs to be sold to traders in Ho Chi Minh City. Once there, the pigs are brought to the slaughterhouses, and carcasses from the slaughterhouses are sold to retailers of fresh meat, who then sell to restaurants and/or processors, as well as to final consumers.

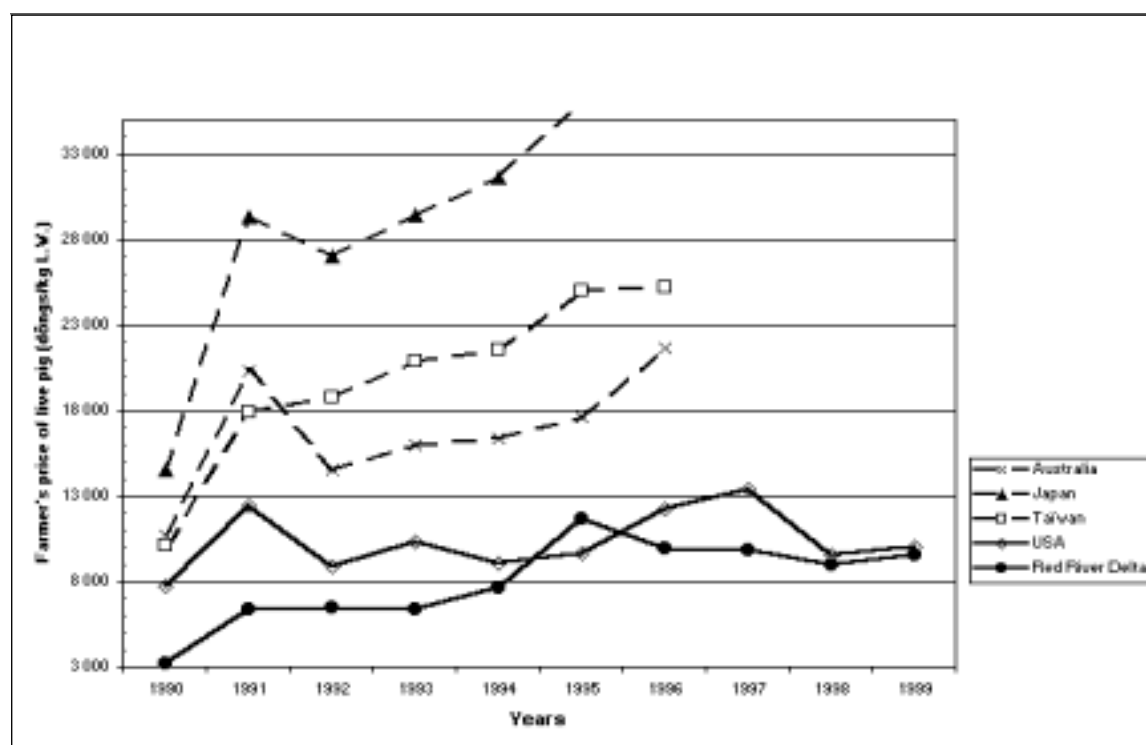
Opportunities for export

Pig exporters are facing a number of difficulties, the main reason being that the price of meat in the domestic market has increased rapidly. For example, in the Red River delta, the live weight price for pigs was 8,000 VND/kg in 2001 and this increased to 14,000 VND/kg in 2002, a 75 percent rise. The live weight price in the central region, on the other hand, was 15,000-16,000 VND/kg while that in Ho Chi Minh City was 18,000 VND/kg. Meanwhile the export price of meat has greatly declined from 1.7 to 0.8 USD/kg. In general, the export price for pigs has declined by 50 percent in the world market, which is a problem since the price of pork in Vietnam is the highest among pork exporting countries. For example, the price of pork in Ho Chi Minh City was about 17-18 million VND/ton (1,116 USD); whereas the price of equivalent quality meat in Russia was 1,070 USD and only 868 USD/ton in the United States. Thus, for every ton of exported meat at these prices, Vietnam incurs losses of about 3 million VND, or roughly 200 USD.

Vietnam exports some tens of thousand tons of pork a year while poultry is not exported at all. It is recognized that the export market does not significantly influence the production of pig and poultry in the country, for the simple reason that the export volume has been relatively low in comparison with the demand on the domestic market.

When comparing the farm gate price of pigs in Vietnam and in other countries in the world, it can be seen in Figure 9 that the Vietnamese price is competitive; that is, it is lower than that in Australia, in Japan, in Taiwan and is very close to that in the United States. However, one disadvantage of Vietnam is that the carcasses produced are of lower quality than in the other countries when measured by internationally recognized standards of quality and safety. This makes it difficult for Vietnamese meat to compete in the world market, and even in the domestic market in the near future.

Figure 9: Farm gate price of live pig in Red Rive Delta and some countries around the world, 1990-1999.



Source: Ecopol project (VASI/CIRAD) VND.

IV. CONSTRAINTS TO OUTPUT/INPUT MARKETS

Factors affecting market participation

Output Markets

Meat quality and safety

Quality requirements between rural and urban areas differ. A study done by VASI indicates that about 86 percent of households in urban areas prefer to buy high quality meat despite the relatively higher price, while about 54 percent will substitute pig fat with vegetable oil. This makes it difficult to sell pigs with high fat ratios in larger cities. The meat quality demanded in rural areas is comparatively lower. While pig fat continues to be widely used, there has been a gradual replacement of pig fat with vegetable oil. In general, consumers in urban areas are willing to pay a premium of about 6 to 16 percent above the regular price, if they can be sure of receiving clean and safe products.

While demand for meat has been rapidly increasing, the shift in demand towards high quality products has likewise become more apparent. The increased preference for product quality has far exceeded Vietnam's ability to produce meat of the desired quality levels. This is largely due to the dispersion in the distribution of various actors in the commodity chain, which only allows loose monitoring, not to mention the fact that the commodity chain would benefit from a more professional set up. Producers and processors, while aware of the demand for high lean meat ratios, do not pay particular attention to the hygiene and sanitary conditions of their products because of the lack of product certification and labeling that would give a premium to products that conform to accepted levels of safety and quality standards. Moreover, there is no mechanism in place (or if there is, the implementation appears to be very loose) within Vietnam that closely monitors the adherence to quality and safety standards by producers and processors. Especially for small producers there is no incentive to produce high quality products because the additional effort and cost involved are not compensated by the potential price they would receive in the market. That is, they are not guaranteed a premium for producing good quality pigs because of the limited number of animals that they can bring to the market.

There are two different quality standards that pose barriers to Vietnamese pig producers, namely for the quality of technology and the quality of hygiene being practiced in production. The technology utilized by many smallholder pig producers in Vietnam results in of low-quality meat and is generally only adapted to small-scale operation; as such there is a wide variation in practices and standard procedures are not applied. Given this, the output produced commonly has low lean meat ratios and low carcass quality. In addition, meat-processing factories usually have difficulties sorting out low quality meat vs. high quality meat for lack of pre-determined standards. Hygiene is not closely monitored from the production unit to the retail chain and this may become a critical factor for consumers to develop a preference for imported meat with guaranteed quality. This is most likely to happen in urban areas where consumers are more willing to pay a premium for safe products. Vietnamese pig meat has also encountered some difficulties in meeting quality control standards demanded by importing countries.

Legal Framework and Standards

At present, the government applies no clear standards for the transport of animals and for slaughterhouses, among others. Private or government agents engaged in various activities in this field pay very little attention to the quality standards that they are supposed meet. As observed in the abattoir in Hanoi, for example, no specific set of standards are being followed for ensuring the hygiene of the processed meat, nor is there a clear, legal definition of what constitutes an abattoir, including where it should be built and under which conditions it should be operated. The lack of clarity in existing government regulations in this field contributes to making the situation disorderly and hence very difficult to attribute accountability to specific entities in cases of epidemics or grave public health hazards. Moreover, when the distribution channel is poorly organised, the agents are likely to operate independently and without regard for regulations pertaining to slaughter and product quality. This has implications on farmers' motivation to produce quality pigs because in the absence of strict quality monitoring, quality is not given a premium in the market price. Furthermore, consumers will not be prepared to pay for quality if quality differences across products are not discernible. The prevailing conditions in production and marketing will most likely reduce the competitiveness of the marketing

chain for pigs and poultry and any other livestock particularly in urban and export markets where these issues are becoming more important.

Bottlenecks in the Distribution Channel

The marketing distribution channels in Vietnam have always been facing problems; they are beset with bottlenecks that prevent the efficient flow of information. This is partly attributable to the bad state of infrastructure across the country, particularly in the rural areas, as well as the unorganized state of the marketing system in the country. There also exists what may be termed a regional fragmentation of markets; meaning there is no or only limited integration between markets, especially between those of the North and the South. This could arise from physical constraints (more apparent), or could be a consequence of institutional factors (less obvious). Previous discussions have indicated that this is also evident in the lack of convergence of prices in these two major regions. But even at the district level within a province, it is common to find a disconnected market system. This situation has implications on the commodity flows and on commodity prices. When small livestock farmers have limited opportunities to sell their marketable surplus in an efficient and profitable manner, this creates a deadweight loss to society. For one, it limits the quantity of output available to consumers, and hence increases the price, thus making consumers worse off as they pay more for a given quantity purchased than what otherwise would be the case. At the other end of the equation is the limited income that the producer can derive from this activity for lack of access to 'efficient' markets; that is, farmer income is lower than what it could have been had he been able to sell his product. At present, the system of roads in Vietnam is largely built with foreign loans that need to be repaid, and the cost of building this infrastructure is being passed on to the commuters in terms of toll fees. This increases the cost of commuting across the country. There is essentially a trade off between efficiency (in terms of good roads and better transport facilities) and the cost of that efficiency (in terms of added transportation cost) and a balance between the two will need to be established. At present, there is a perception among the Vietnamese population that these additional fees are increasing the cost of product flow along the commodity chain. Much of these costs actually arise from informal rent seeking activities that have been observed to happen. For example, according to a survey conducted by IFPRI and MARD for the DANIDA-funded project in 2000, about 20-30 percent of traders indicated that the police poses a major barrier to market access because of the illegal fees that they require traders to pay for letting them pass through irregular tollgates to bring their products to the market. Moreover, almost 70 percent of traders indicated that the police are a major barrier to their trading activity.

Limited Access to Information

Traders generally supply the small farmers with information about markets and prices. The government information network is not organized in a systematic manner with overlaps between and across various government agencies. Therefore, government institutions have not been supplying the kind of information that farmers can use in their marketing activities. In addition, information is not available in a timely manner; whatever type of information eventually reaches the farmers and other agents in the commodity chain is either outdated or not useful at all. Because of the fragmentation of the marketing system in the country, there exists a great variation in prices. Without timely information as a basis for marketing decisions, farmers usually are at the losing end of the bargaining process vis-à-vis traders and other agents who have more information due to their exposure to a wider geographic area and larger number of market players. Furthermore, with limited information, small farmers do not know where and to whom best to sell their animals and so be able to obtain a fair price. Given this, farmers have less incentive to raise animals that are targeted to a specific market where they would expect to obtain a fair economic return for the value of their output. There is thus limited scope for price differentiation as the farmer is faced with a nebulous market.

Input Markets

Quality and Price of Animal Feed

Good quality animal feeds have relatively high prices compared to inferior quality feeds, as found in a study by IFPRI and MARD in 2000. Animal feeds that are locally produced by private local feed companies are generally perceived to be of lower quality than those produced by foreign-owned feed milling companies. However, with very loose regulations for labeling and product quality certification it

is very difficult to differentiate between low vs. high quality feeds being sold on retail in the market. Consequently, farmers' decisions on feed purchase are largely driven by the price. This choice has implications on the quality of animals produced because feed quality is highly correlated with meat quality. Even under these circumstances, farmers consider that the prevailing prices of animal feeds are generally too high, notwithstanding the level of quality of these feeds. The high prices can be attributed to high costs of raw materials for these feeds, namely, maize and soybean, among others. Compared to world market prices, prices in Vietnam are higher and the price difference is largely a result of the government's protectionist policy for agricultural products. Specifically, high import taxes are imposed on imported raw materials, in order to protect local production of these commodities. On the other hand, animal feed manufacturing companies are given permission to import these raw materials at lower costs (i.e., minus the import taxes). This prevents smaller local companies from competing with these big firms in terms of cost-efficiency since the former do not have access to preferential import prices for raw materials for animal feeds. As a result, local companies will compromise on product quality in order to obtain the highest margin from the sale of their product. Unless something is done to correct this cycle, this behaviour will perpetuate the low-quality feed-low-quality meat cycle that undermines the competitiveness of the smallholder livestock sector and prevent farmers from becoming important players in the emerging markets for good quality products.

Quality and Price of Animal Breeds

The genetic quality of the animals that are accessible to small farmers is questionable because animals are usually obtained from private breeding operators who are not subject to government or any other regulation. As a result, they are not particularly concerned about the quality of their animals. Moreover, the majority of these private breeding operators have the technical knowledge to fully maximize the potential productivity levels of the breeds that they are raising. Government breeding centres, on the other hand, are generally operating inefficiently, with production costs being so high that they have difficulties in producing quality stock at prices affordable by small farm operators.

Livestock Services and Inputs

While the supply of veterinary medicines and vaccines is often not a major constraint, price and quality factors may impede their effective use. A reasonable legislative and regulatory base for disease management is eroded by weak field level institutions that are generally under-resourced, with inadequately trained staff, and poor data collection, storage, and retrieval systems. The supply of veterinary services has in some cases weakened and become ineffective because of the devolution of functions from the central to the local government units. This limits the effectiveness of veterinary and extension services to provide the necessary inputs to animal production by smallholder farmers. The consequence is low productivity as a result of animal health and management problems.

Transaction Costs

The predominantly small-scale operations and the wide dispersion of production units contribute to increasing costs of collection, selection, and classification, resulting in higher transaction costs along the commodity chain. In addition, the high risk of getting poor quality pigs from various sources with uncertain product quality, adds to the costs in terms of moral hazard. Specifically, when buying pigs from uncertified sources, the uncertainty about product quality is imposing a 'tax' on the value of the good, in that the potential buyer will be reluctant to pay the market price for a pig of acceptable quality, thus generating a loss in potential income to the farmer-producer. Hence, there are two levels of transaction costs that are critical in the commodity chain. The more obvious ones are the costs incurred from inefficiencies and multi-layer marketing channels. These are illustrated in the results of the VASI study on pig marketing in the RRD. The selling price was estimated to increase by about 20% on average from the farm to market under existing market channels (Table 12).

Table 12: Variations in the price of pork.

(The increase in prices from production to consumption, if we compare the same kind of pig
F₁(Domestic x Foreign)

Departure and arrival	Producer price of 1kg live weight (Dongs/1kg)	Retail price of 1kg live weight (Dongs/1kg)	Proportional price increase (%)	Producer price as proportion of retail price (%)
Long An – Ho Chi Minh ¹	12,000	15,511	31.8	75.9
Suburb of Ho Chi Minh – Ho Chi Minh ²	13,000	16,990	30.6	76.5
North East South ³	14,356	16,025	11.6	89.6
Red River Delta ³	10,021	10,319	3.0	97.1
Nam Dinh – Nam Dinh ⁴	8,480	9,180	8.3	92.4
Ha Tay – Ha Tay ⁴	9,265	10,021	8.2	92.5
Nam Thanh – Nam Thanh ²	9,000	10,737	19.3	83.8
Nam Thanh – Hai Phong ²	9,000	11,320	25.8	79.5
Nam Thanh – Hai Phong ¹	9,500	12,287	29.3	77.3
Ha Tay – Hanoi ⁴	9,265	11,043	19.2	83.9
Nam Dinh – Hanoi ⁴	8,480	10,371	22.3	81.8
The North – Ho Chi Minh ²	9,000	16,990	88.8	53.0

Source: ¹ K. Le Goulven, 1997; ² Vu Trong Binh, 2000 ³ F.Goletti, 1999 ⁴ Ecopol, 2000, Dao The Tuan 2001.

Marketing costs comprise the largest component of transaction costs incurred from the farm gate to the consumers. Because of the structure of the prevailing marketing system for livestock products in Vietnam with many different stages from production to consumption, the cost of moving the commodities along this chain rises. Studies on the marketing of agricultural crops for livestock feeds such as maize in the Northwest and rice in the South indicate that the increase in price amounted to about 50 to 100 VND per kilo of the commodity from the farm to the wholesalers and/or retailers to the final consumer. A study of the marketing of feed supplements from Hanoi to Hai Duong and from Hai Duong to the districts and communes showed that the marketing costs increased by 306 percent, and 10-15 percent, respectively. Mixed feeds, on the other hand, are usually distributed by large companies through different types of agents. CP and Proconco, for example, have classified their agents into 1st grade, 2nd grade, 3rd grade and so on, and each of these grade levels receive a corresponding percent share of the value of feeds that they can manage to sell. These agents are authorized to impose a mark-up on their prices as payment for their distribution services. The mark-up ranges from 1-3 percent depending on the agents' classification. These are additional costs that are passed on to the farmers who buy these feeds for their animals.

V. THE ROLE OF POLICY IN ADDRESSING CONSTRAINTS

A recent policy statement from the MARD said that it expects an increase in earnings from agriculture, forestry, and fisheries by 2010. In order to achieve this, the agricultural sector should grow produce to meet market demands, and this can only be done when farmers modernize production to increase product value and productivity. Vietnamese farmers' living standards remain very low despite government efforts to improve production and infrastructure in the rural areas. The failure to improve farmers' living standards can be attributed to the many constraints they face, among which are the limited land availability (average agricultural land per capita is about 0.1 ha) related to the high population density, and the low competitiveness of their produce due to poor quality and productivity. An investment strategy that is capable of connecting the farmers with processors and markets is missing as well.

The livestock sector in Vietnam has received little budgetary support and also little regulation regarding marketing, health, and the environment. This is most apparent in the case of animal health, condition and location of the slaughtering/processing industry. Even though there are limited policy induced distortions in production, marketing, and feed industry, the government has apparently directed its effort more towards production and commercial activities rather than in regulatory, capacity building, and research and extension activities. Only when attention is directed at these latter aspects of development will the constraints be minimized. While the sector has grown relatively well in the past despite the minimal role played by the government, this does not suggest that it will remain to be the best policy for the sector. The government should instead focus on providing the public goods that are currently being undersupplied and the private sector should be left to undertaking commercial activities.

Recent policy reforms in the country, notably the shift from collective management systems towards more individual, private action as indicated in Resolution N100, has certainly affected the way business is being conducted at the farm level. It has resulted in strong agricultural growth in the 1980s. Subsequent reforms embodied in Resolution N10 have further strengthened the autonomy of farm households in the conduct of agricultural production activities, including livestock. The current policy towards diversification of Vietnam's agricultural production has likewise provided impetus for the expansion of livestock production in the country. However, this development has also brought with it some problems that have direct impacts on smallholder production especially regarding investment priorities. With the government's apparent tendency to provide more investment incentives towards the development of commercial production especially in breeding for the export market, an unintended bias against the development of the smallholder producers has been created. This bias has been manifest in the various constraints that are identified and discussed in the previous sections. While some constraints have been the result of external factors to which Vietnam has become more susceptible because of the opening up of its economy, it is recognized that existing policies and institutions within the country have exacerbated some of these constraints. It is noteworthy, however, that within the Ministry of Agriculture, there awareness of these constraints is growing and new development programs and policies targeted to develop the livestock sector are being implemented.

VI. EXAMPLES OF INTERVENTIONS TO ADDRESS BARRIERS TO MARKETS

Though the government has various programs in place that are aimed at stimulating livestock development through extension for improving meat quality and animal productivity, in many cases the results obtained have not been as successful as expected. A number of examples from the various projects that have been undertaken in Vietnam are presented as follows.

In 1990, VASI initiated a project on breeding improved pig breeds in Yen So (Ha Noi). The project was an experiment in pig breeding at the household level. Previous experience had been concentrated on large scale breeding programs involving major investments in materials and technical skills provided by experts. The project, unfortunately did not successfully achieve its objectives after two years because of a number of institutional defects in the implementation in addition to other constraints beyond the control of the farmer. These include the overall focus on just the technical aspects of production without considering the potentially important role of market incentives, the high risk of diseases and the limited capacity of farmers to adequately cope with nor respond to these risks, the lack of resources to sustain the relatively high cost of production, and the lack of adequate field testing of the technologies to validate results on station.

Similarly In 1990, the Hai Duong Science Committee (now, Hai Duong Science, Technology and Environment Department) in cooperation with VASI distributed pigs with a 3/4 share of foreign genes to smallholder farmers for breeding purposes in Hong lac commune, Thanh ha district. However, after termination of this experiment, farmers shifted back to breeding crossbred F₁ pigs as they had done before.

Together with the distribution of pigs with a high proportion of foreign blood in 1999, Hai Duong province started a program of distributing exotic sows for breeding purposes. Hundreds of exotic sows were obtained by Hai Duong province for Nam hung commune, Nam sach district. Assistance in supplying the feed for these animals was also provided. However, the exotic sows were gradually eliminated over time. One year later, in 2000, there were only 20 sows left, supplying piglets to newly formed livestock groups with the support of the Red River program of VASI. Factors that made the above programs unsustainable include the strong focus on the technical questions and technical aspects of breeding, and the concomittant lack of attention on factors such as knowledge and skills in marketing (Bui thi Thai et al. 1999).

Ha Tay is one of several provinces that introduced new technologies in pig production and obtained good results from their application. Through cooperation and exchange of knowledge and expertise with the Department of Rural and Agricultural Development and with the breeding companies, positive results have been achieved. Since 1993 Ha Tay has become one of the major pig exporting provinces, producing large numbers of piglets. One farm occupies the second place after Hai Phong as it exported more than 1,000 tons in 2001. On the whole, the North exported 10,000 tons.

Many communes became main points within the province for the breeding program. The breeding program was targeted for improved pig meat. In order to achieve this, the province and districts cooperated with the research institutes to support the dissemination of livestock technology to smallholder farmers. The investment contributions included capital (about 33 million VND) for upgrading local breeds and developing pigs with a high proportion of lean meat. Every year, Ha Tay province also invests millions for developing pigs with a high proportion of lean meat. However, this investment was not sufficient to develop breeding farms to breed "grand father-grand mother" stock. This will require still more investments. Apart from the assistance in supplying breeds and in building pigsties, provincial units of MARD and the district bureaus also assigned personnel to provide assistance in livestock and veterinary technologies for small farmers⁴.

Despite the many efforts and very large investments, the results from exotic pig breeding in Ha tay are still limited. The models of exotic pig breeding have not yet multiplied and expanded to a wider scale as they have had mixed results so far. However, in Trung chau commune, some smallholder households have managed to breed thousands of piglets per household per year for export. Other households breed some sows that are producing piglets supplied to these families. It can therefore be concluded that the target of the project has not been achieved, because the exotic pig strain has not

⁴ According to information of Mr Duc, Vice director of Ha tay agriculture and rural development department

been widely adopted into household production to increase domestic meat supply. In some other districts such as Quoc oai also there were some households who were already breeding exotic sows and were organized in livestock associations composed of 10 persons.

The experiences of the above mentioned projects indicate that while breeding of improved pig breeds has been introduced, the efforts were largely targeted to the production of pigs for export and not for increased production for the domestic market. The production models that have been applied have so far been able to exist only because of the large support they receive. It is questionable whether these models could be sustained without the subsidies from the projects.

In the case of poultry, breeding of exotic strains has been mainly developed in the big farms. Small farms have proved to be ineffective in these projects. In some regions, new poultry strains such as: Super meat duck C.V, Super M, were imported into Vietnam in 1989 within the framework of the project on "research and development of duck raising - VIE 86/007" that was supported by UNDP. In 1993, this duck strain was adopted very widely and currently there are up to 75,000 female ducks in the whole country. Besides, there are also projects that provide specific chicken strains and dual-purpose chicken breeds for production in many regions of the country.

In summary, the government projects in the past years have had some impact but have not been entirely successful. The main factors for the limited success include the following:

- The exotic breeds require conditions that are much more demanding than those of currently used pig breeds. The requirements concerning hygiene, diets, breeding facilities, prevention and elimination of epidemics and diseases of exotic breeds often are beyond the ability of most smallholder farmers to handle. If smallholders want to keep exotic breeds, they should be able to provide all the necessary conditions for breeding and at the same time be equipped with the technical knowledge to do so. The shift from keeping traditional strains to keeping exotic strains requires a learning process and experience. Many smallholders were not prepared thoroughly and many projects had no suitable training and extension methods to ensure this.
- Keeping highly productive strains in present conditions requires making considerable investments; otherwise the cost of production will increase substantially. Most of the available technologies are based on a thorough knowledge of the biology of pigs but have not been fully tested at household level. There is thus a need to undertake a test series under varying conditions to validate their applicability outside the research station. But up to now, it is very rare for research institutes to undertake experiments of this kind. The research institutes often base their technical guidelines on results from experimental stations, so that the extension service officers have difficulties in providing suitable advice and recommendations to smallholders who have encountered problems in their specific situations.
- The scale of smallholder breeding is still small and there is no integration among these small-scale production units. Thus when exotic breeds are introduced, the new investments often increase the production cost substantially. On other hand, although the quality of product is higher, only a few smallholders are able to engage in this production activity, so it is very difficult for them to bargain for a good selling price based on the higher quality of their product due to the limited number of animals being supplied. The collectors incur more time to collect a sizeable number of good quality animals, so that the expenses for collecting rise and the prices offered to farmers falls. Given these conditions, there is very little incentive for smallholders to improve product quality through adoption of improved or exotic strains.

VII. POTENTIAL AREAS FOR RESEARCH AND DEVELOPMENT

At present, the Vietnamese government pays special attention to investment policies in order to overcome output shortages of livestock products. The following issues have been identified as important.

- More attention should be given to studying smallholder organizations as a pathway for addressing issues of output marketing. This is important and should be the main feature of any livestock development strategy. It could help smallholders to more easily link up in production and also to access markets.
- There should be a well-defined standard for slaughterhouses and meat processors. These standards should be enforced with penalties for violators. The government should define the standards suitable for every stage of the production process, and avoid adopting standards that may prove unsuitable to existing conditions within the country.
- The government should encourage the formation of associations of slaughterhouse operators and of traders. This should facilitate private investment for upgrading the quality of slaughterhouses and avoid the dependency on public investment.
- Encouragement of investments for establishing more processing factories, both for supplying the domestic and export markets. It is also worthwhile looking into a more diversified processing approach, in order to add value to meat and other livestock products. Market niches for these products should then be identified and developed.
- Encourage the use of labels to signal product quality. The government will need to set standards for product labeling and certification.

In order to improve the input markets for livestock production, the following issues need to be considered:

- The government will need to strengthen the breeding system and work with private companies to ensure the availability of highly productive breeds to smallholder producers. Moreover, it would be advisable to replicate these breeding schemes at the household or small farm level within the local area in order to reduce the costs that are currently being incurred at government breeding centers. This will ensure that smallholders will be able to obtain the exotic breeds more easily and at an affordable price.
- The feed processors will need to be encouraged to provide more information about the quality of their products. It is, therefore, necessary to set up a framework that will govern the monitoring and quality control system. An example would be regular random sampling of products from these processing companies in order to ensure their safety. A regulatory body will need to be set up and given adequate legal authority to impose these regulations.
- It is necessary to develop the domestic production of maize, soybean and fish meal whenever the country has a comparative advantage for doing so. Apart from that, taxes on imported feeds should be eliminated to minimize the bias towards big companies that are exempted from these taxes. The quota policy now allows the animal feed companies to be subjected to a low tax rate which is not accessible to small producers.
- It is necessary to help small farmers to form groups and cooperatives in order to reduce the input costs through collective action (to buy feed together, to access the veterinary services). These organizations will be the agents of the government offices, the extension services, among others, and small farmers' organizations will protect members against competitors.
- It is necessary to establish a legal framework for organizing private veterinary associations. Those will have the task to manage the private veterinary practitioners, train and develop the veterinary bases, and to help the private veterinary associations to take part in the prevention of animal diseases through contracts with livestock groups, farms and the government. It is also necessary to separate the role of the government in the veterinary management from that in the prevention and protection against epidemics and other animal diseases.

- The government will need to foster the formation of small scale farmers' associations and/or cooperatives, so that they can take part in the market and be able to compete with the big domestic and foreign farms. This is an important policy and development strategy that will avoid the negative consequences of large-scale livestock development. The government investment should be concentrated on supporting these cooperatives and associations in order to stimulate their development.
- The financial sector should establish preferential lending rates for small producers' associations. The Government, on the other hand, should establish the land policy for livestock cooperatives so that they can build animal housing (sheds, pigsties etc...) in areas suitable for these activities or provide areas for grazing without engendering negative externalities such as environmental pollution.
- In this regard, the government may need to revise existing laws on cooperatives in order to provide more flexibility to interested parties to establish these cooperatives and associations. This will provide legal personality to these organizations. Under the current set up, the requirement for cooperatives to own capital has been a major constraint to the formation of legal cooperatives by smallholder farmers. The government should also look at the option of changing the perspective in the cooperative law in order that the cooperative shifts from being a trade unit into a coordinated unit of the households' collective activities.
- It is necessary to consolidate and subsidize the artificial insemination stations at district level, especially in the poor districts that are not able to sustain the operations of these stations.

The following research and development questions are identified as relevant to Vietnam's situation in the coming years:

- To study the production organization, it is necessary to develop new production models for smallholder producers that will reduce costs, increase product quality and competitiveness. These models should be consistent with the livestock development objectives, as well as with rural development.
- To identify ways in which smallholder production may be made more efficient through capacity building and enhance skills not just in production activities, but also in organization, management, marketing and resource mobilization among others.
- To study the commodity chain and understand the prevailing organization and transaction costs incurred along the distribution channels in order to identify and develop new models that will lead to quality enhancement from production to consumption, and ensure the effective and sustainable integration of various players within the system.
- To build local capacity for livestock production and development activities, in order to improve training for smallholders, and effective dissemination of development models under varying conditions.
- To develop analytical models that will link production, processing and consumption.
- To investigate options for product labeling and certification that are suitable to small farmers conditions.
- To study institutional policies that have direct impacts on the livestock commodity chain and prescribe options to improve the participation of smallholders in this commodity chain.
- To study and define the optimal size of production, collection, processing and slaughter where economies of scale may be important.

VIII. SUMMARY AND CONCLUSIONS

This study provides a comprehensive view of the development of the livestock sector in Vietnam. It also identifies barriers to livestock input and output markets for smallholder producers in the country.

Specifically, constraints to livestock input markets include the uncertain quality and high prices of animal feeds including raw materials for feed processing, variable quality and high cost of more productive animal breeds, and inefficient delivery of veterinary services and high cost of veterinary inputs. Constraints to reaching output markets include the poor quality and unsafe meat, the lack of a legal framework and standards, bottlenecks in the distribution channel, and limited access to information. In addition, the prevailing marketing system and channels for each type of commodity from farm to market have evolved into a multi-stage system that is characterized by high transaction costs, and lack of integration among the players in the various channels. The lack of an organized marketing system for livestock in Vietnam does not provide an enabling environment that will encourage producers to improve production activities for lack of some basis for comparison. In addition, it also perpetuates the low market power of producers relative to other players such as the traders and wholesalers.

It is envisioned that the government could play a regulatory role in ensuring that standards and regulations to produce high quality, safe meat and meat products are enforced and sustainable. Moreover, research into the development of alternative production models that are suitable to smallholder producers and at the same time capable of generating high quality and safe meat and meat products would be important in engendering more smallholder participation in emerging markets for livestock. Collective action to take advantage of economies of scale in input procurement as well as output marketing could potentially be developed and tested for replication on a wider scale. Government support for these initiatives would certainly be desirable.

Vietnam is on the verge of transition from a mono-crop economy, to one that is more diversified, and the livestock sector is becoming one of the key players in this transition process. In laying out the priorities for the development of the sector, an important point to consider is the extent to which smallholder producers are being involved in the development process instead of gradually being marginalized through inappropriate institutions and policies. In addition, it is important to note that a huge impetus of this development process should be anchored on the rapidly growing domestic market and the changing nature of its demand. The export market has huge potentials but in the near term it is the domestic market that will be driving the growth of the sector. Targeting the export market will have to be a long-term objective, after the conditions of the domestic market will have improved and set the stage for a more broad-based growth of the sector.

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